

ARISTOTLE

ON THE SOUL PARVA NATURALIA ON BREATH

WITH AN ENGLISH TRANSLATION BY

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INTRODUCTION

ARISTOTLE, the man, we know; the works of Aristotle, the philosopher, present almost insuperable problems. We know as much of the life of Aristotle as of most of Hellas' great men, but we find it difficult, if not impossible, to regard his work as his contemporaries regarded it. His writing was considered a model of Greek prose style at its best, but no one who reads his works as they have come down to us could subscribe to this view. In the treatises comprised in this volume, the philosopher is sometimes lucid and bald, sometimes involved and obscure, and sometimes even unintelligible, but very rarely brilliant in style.

Yet we need not necessarily blame Aristotle for this. In days when there was no copyright corruption of the text was fatally easy, and if we are to believe Strabo, the works of Aristotle were peculiarly unfortunate in this respect. According to that author, Aristotle left his library to Theophrastus, who handed it on to others. It passed through a good many hands, including those of one Apellicon, who is delightfully described by Strabo as "a book-worm, rather than a philosopher," by whom the gaps in the manuscript caused by damp and moth were filled in "not well." Later on still, when Sulla captured Athens, they were transferred to Rome, and edited by inferior clerks under the direction of

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booksellers who made no attempt to collate the different copies. Small wonder if we find them often obscure and lacking in style. There is, however, another view of the works which have come down to us bearing the name of Aristotle. Cicero refers to them as *commentarii*, and it is quite possible that the present volume contains nothing but lecture notes compiled either by Aristotle himself or his pupils. This would account for the unevenness of exposition. Some points are argued in full, some are only briefly outlined. It might also account for the numerous cross-references to other treatises, some of which cannot be traced.

Yet, in spite of obscurity and baldness of style, it would be quite wrong to suppose that these treatises are valueless. An attempt has been made in the introductions to the separate treatises to show where this value lies for us to-day.

The modern reader studying Greek philosophy is confronted at the outset by a difficulty which must be boldly faced. Aristotle received his training in the school of Plato, and from him inherited many of his fundamental beliefs. Plato had come to regard the world of sense as unreal, and only the world as apprehended by the mind, detached as far as possible from sense impressions, as real. Aristotle repeatedly shows this Platonic influence in his handling of philosophical questions. He pursues an argument in the direction in which Logic leads him, quite unmoved by any apparent absurdity in the conclusions at which he arrives. Thus in this volume Aristotle will often be found to reach conclusions, which at first sight seem only fantastic; but such are always worth careful and unbiased consideration.

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This collection of treatises belongs to subjects on the borderline between bodily and mental. Aristotle was the son of a doctor, and himself a biologist, who believed in experiment and dissection as a means of collecting evidence. Thus his views on the soul are influenced by his physiology. Yet he never falls into the meshes of materialism, and appears quite certain that the body cannot possibly explain the mind. His method is analytical, his logic, within the limitations imposed by his age and personal character, is ruthless, and his knowledge is encyclopaedic. His arguments and conclusions should assuredly serve to stimulate, even where they fail to satisfy.

Finally, without any monotheistic conception of God, Aristotle believes implicitly in design and purpose in the universe, and lays it down as axiomatic that no account of any part of the body or function of the mind can be considered adequate, unless it shows the purpose which it serves in the scheme of creation.

THE TEXT

The present text is that of Bekker. It is based in the main upon two mss. known as Codex Parisiensis and Codex Vaticanus. Bekker also collated six other mss., which seem to have come from one original. Since the publication of Bekker's recension a considerable amount of research has been devoted to the mss. This has suggested a number of alterations, some of which have cleared up doubtful points or

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have made unintelligible passages comparatively clear. Where such an alteration has seemed important it has been incorporated in the text, and the original "Bekker" reading printed as a footnote followed by the letter B. In most cases it has not seemed worth while to print other mss. variations.

I have found it impossible to express in detail my indebtedness to those many scholars who have edited or revised the text of Aristotle's *De Anima* and *Parva Naturalia*, but all who have worked in this field must be conscious how great that debt inevitably is. In the translation it has been my aim to make Aristotle's meaning as clear as possible, even if this has involved contraction or (more commonly) expansion of the Greek. I have one other debt to acknowledge: my thanks are due to Messrs. R. & R. Clark's reader, who has dealt so ably with the German text (in spite of the comparative poorness of the type and the irritating contractions) that my own task of proof correction has been reduced to a minimum.

It may assist the general reader to add an explanation of some of the technical terms used by Aristotle in this work.

δυνάμει ("potential"). A man is "potentially" (e.g.) a thinking being, but he is not always thinking. When this capacity is actually operating, Aristotle calls him ἐνεργείᾳ ("actually") a thinking being.

ἐντελεχείᾳ ("actuality" or "actualization"). This term frequently overlaps ἐνέργεια, but in its

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most exact sense it means more. It is the perfect realization of all that any creature or power is capable of becoming.

εἶδος ("form"), often contrasted with ἔλη ("matter"). Matter in itself is formless; e.g. the marble from which a statue is carved. When it has received εἶδος, it becomes τόδε τι ("particular thing").

κατὰ συμβεβηκός ("accidentally"), τὰ συμβεβηκότα ("contingent attributes"). A table may be green, but its greenness is only "accidental"; that is to say, if it were (e.g.) brown, it would be just as much a table as before. But there are some qualities which belong to its οὐσία ("essence," "essential quality"). We assume this to be true of all objects of sense, and although it is always difficult and usually impossible to determine exactly what these qualities are their sum total constitutes the τὸ τί ἦν εἶναι ("that which makes it what it is").

νοῦς ("mind"); the most general word, including frequently both the percipient and the intellectual faculties. It is sometimes subdivided by Aristotle into νοῦς πρακτικός (the mind as applied to producing results) and the νοῦς θεωρητικός (the mind regarded as purely contemplative).

πάσχω ("be acted upon" or "affected"). Both in the physical and intellectual worlds influences of different kinds are at work. If such an influence operates the object of it is said παύσχειν. The noun πάθος ("affection") is to be interpreted in this sense.

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φαντασία ("imagination"). The word is used by Aristotle in two senses: (1) sometimes it operates in the presence of the sensible object and thus "interprets" the object to the mind; (2) sometimes it operates in the absence of the sensible object, and then is either a form of memory or what we call "pure imagination."

ON THE SOUL

INTRODUCTION

It seems impossible to avoid the word "soul" as a translation of the Greek $\psi\chi\acute{\eta}$; indeed it would be entirely suitable were it not for the religious connotation with which the word is invariably associated in the language of to-day.

This treatise has more interest for us as the foundation of the modern science of psychology than for its actual conclusions. It is not to be supposed that Aristotle was the first to inquire into the nature of the soul; far from it. Indeed he builds on the foundations laid by his predecessors, particularly Plato. But he was the first to grasp the importance of the application of scientific method to the inquiry. The present treatise was not Aristotle's only work on the subject; but we have only fragments of his dialogue—the *Eudemus*—and these for the most part only repeat the arguments of the *De Anima*.

A precise definition of the soul is hard to come by, though we shall find one in this work, which Aristotle ultimately accepts, but we may premise that the author means by the word that in virtue of which the term living is applied to plants, animals, and above all to men; but we are not to understand from this that each of these three classes has a soul of the same kind.

ON THE SOUL

ARGUMENT

Book I

A reader who wishes to know nothing beyond what Aristotle himself can contribute to psychology could afford to omit nearly the whole of Book I.; for the author has devoted it in the main to clearing the ground for a statement of his own views in Books II. and III. Yet this first book has a value of its own, in that it shows that Aristotle did not consider himself a pioneer in this field, though he clearly regards his predecessors' conclusions as always inadequate, and often quite erroneous.

The first chapter raises some preliminary questions as to the right method of approach to this important subject, and as to the category to which the soul properly belongs. The philosopher then passes on to consider how body and soul are related. We ourselves are quite familiar with this problem. We find ourselves continually baffled in an attempt to draw an accurate line of demarcation between the "physical" (as we call it) and the "mental." Aristotle's conclusion (which is further developed later in the treatise) is that the soul itself is without question incorporeal, but that it has no possibility of action apart from the body to which it belongs. In his own language it is only separable from the body in thought, in just the way that a geometrical truth is only separable in thought from the figure to which it relates.

The rest of the book is mainly devoted to those characteristics of the soul which are acknowledged by earlier thinkers. It is the cause of movement, and it is composed of the elements. To neither of these

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propositions does Aristotle give unqualified assent, nor on the other hand does he explicitly deny them. He, however, points out with a good deal of closely reasoned argument, that many difficulties arise if these two characteristics are accepted without qualification.

He denies the doctrine that the soul moves itself. This erroneous theory was based on the belief that the soul is the cause of movement and that nothing can produce movement, which does not itself move. At the same time he admits that there must be some connexion between movement and the soul, but he leaves its precise nature undetermined. He suggests in chapter 4 that the soul may only move "indirectly," that is, that it may be in something which moves (the body), and only moves in this sense.

The second supposed characteristic of the soul—that it is composed of the elements—seems to Aristotle equally unconvincing as it stands. If the soul is composed of the elements it cannot escape from being corporeal; and, even if this conclusion were not inevitable, it would be impossible on this hypothesis to account for many of the admitted functions of the soul.

The rest of Book I. is occupied with other earlier theories, particularly with the question whether the soul has parts, or is one and indivisible. Aristotle seems to conclude that the soul has parts, but that these parts are not qualitatively different.

Book II

This book begins with a tentative definition of the soul; it is found to be "the first actuality of a natural body possessing life." These difficult words will

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repay careful consideration. A block of marble is the "matter" out of which the statue of Hermes is made. The marble may then be said to be potentially a statue of Hermes. But when it receives "form"—given to it by the sculptor—it becomes "actually" a statue of Hermes. Similarly the body being the "matter" the soul gives it form, and the living being is now actualized. So the soul is the actuality of the body. It is called the first actuality as opposed to the second, which is the soul when performing its functions.

Chapter 2 begins with an explanation of true definition. Aristotle decides that his present definition is too abstract, and that a much closer investigation of the functions of the soul is essential to a true understanding of it. They are found to be nutrition, sensation, thinking and movement. After some argument these functions are found to constitute a series, the later terms of the series implying the earlier ones, so that as we ascend from the lower to the higher forms of life we find more and higher functions.

The most elementary and essential faculty of the soul is the nutritive. In this is included both feeding, which preserves the life of the individual, and reproduction, which preserves the life of the species.

The remainder of Book II. (chs. 5-12) is concerned with sensation. Aristotle deals first with sensation in general and then with the senses in particular. Vision and the objects of vision first come under review. It is found that light is an essential condition of vision, and Aristotle offers us a physical explanation of light, which is largely inaccurate. He then outlines a theory, which he discusses later

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on, that in between the sensible object and the sense organ which perceives it there must exist a medium, without which no sensation will be felt.

Chapter 8 deals with sound on similar lines, chapter 9 with smell, chapter 10 with taste, chapter 11 with touch, while the last chapter attempts a definition of sensation in general.

Book III

This book begins with a complicated and somewhat unnecessary argument to prove that there are only five senses, and that therefore anything which is perceived, and yet appears not to be the object of any one of the five, must be perceived by a combination of two or more senses. After the discussion of some further difficulties in the operation of the sensitive faculties Aristotle proceeds (ch. 3) to consider the relation between sensation and thinking. He finds (ch. 4) that though they have obvious superficial analogies they are not really analogous. From this point up to the end of chapter 8 he deals with the mind, its method of operation, and how far its power of abstract thinking is illusory. In chapter 8 he attempts to summarize his views on the relations between the sensitive and thinking faculties of the soul, and decides that although they can be conceived as separate they are really interdependent and inseparable. In chapter 9 Aristotle reaches the question how movement is associated with the soul. On the commonly accepted view that there are definite and separate parts of the soul he cannot account for movement as due to any one of these, though he thinks (ch. 10) that it may be due to

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“appetence and mind.” In chapter 11 mind is dismissed as being a real cause of movement, and appetence seems to be left to account for it. The last two chapters attempt to explain why the various forms of life occur in an ascending scale, graduated by the possession of more and more faculties of the soul. Touch is the one indispensable faculty, without which the living creature must die ; the other (and presumably higher) faculties exist in the higher animals, not that they may live but that they may “live well.”

ΑΡΙΣΤΟΤΕΛΟΥΣ ΠΕΡΙ ΨΥΧΗΣ

Α

- 402 ^a I. Τῶν καλῶν καὶ τιμίῳ τὴν εἶδῃσιν ὑπολαμβάνοντες, μᾶλλον δ' ἑτέραν ἑτέρας ἢ κατ' ἀκρίβειαν ἢ τῷ βελτιόνων τε καὶ θαυμασιωτέρων εἶναι, δι' ἀμφοτέρα ταῦτα τὴν τῆς ψυχῆς ἱστορίαν εὐλόγως
5 ἂν ἐν πρώτοις τιθεῖμεν. δοκεῖ δὲ καὶ πρὸς ἀλήθειαν ἅπασαν ἡ γνῶσις αὐτῆς μεγάλα συμβάλλεσθαι, μάλιστα δὲ πρὸς τὴν φύσιν· ἔστι γὰρ οἶον ἀρχὴ τῶν ζώων. ἐπιζητοῦμεν δὲ θεωρῆσαι καὶ γινῶναι τὴν τε φύσιν αὐτῆς καὶ τὴν οὐσίαν, εἴθ' ὅσα συμβέβηκε περὶ αὐτήν· ὧν τὰ μὲν ἴδια πάθη
10 τῆς ψυχῆς εἶναι δοκεῖ, τὰ δὲ δι' ἐκείνην καὶ τοῖς ζώοις ὑπάρχειν. πάντῃ δὲ πάντως ἐστὶ τῶν χαλεπωτάτων λαβεῖν τινὰ πίστιν περὶ αὐτῆς. καὶ γὰρ ὄντος κοινοῦ τοῦ ζητήματος πολλοῖς ἑτέροις, λέγω δὲ τοῦ περὶ τὴν οὐσίαν καὶ τοῦ τί ἐστι, τάχ' ἂν τῷ δόξειε μία τις εἶναι μέθοδος κατὰ πάντων περὶ
15 ὧν βουλόμεθα γινῶναι τὴν οὐσίαν, ὥσπερ καὶ τῶν κατὰ συμβεβηκὸς ἰδίων ἀπόδειξις,¹ ὥστε ζητητέον

¹ ἀπόδειξιν B.

ARISTOTLE : ON THE SOUL

BOOK I

I. We regard all knowledge as beautiful and valuable, but one kind more so than another, either in virtue of its accuracy, or because it relates to higher and more wonderful things. On both these counts it is reasonable to put an inquiry into the soul among subjects of the foremost rank. Moreover this investigation seems likely to make a substantial contribution to the whole body of truth, and particularly to the study of nature ; for the soul is in a sense the basis of animal life. So we seek to examine and investigate first the nature and essential quality of the soul, and then its contingent attributes. Of the latter some seem to be affections peculiar to the soul, and others seem to belong to all living things by virtue of the soul. But to attain any sure belief on the subject is hedged with difficulties on every side. This inquiry has the same characteristics as many others, such as that concerned with essential quality and real existence, and one might suppose that there was one method applicable to all the things whose real nature we wish to understand ; just as syllogistic demonstration applies to all their contingent attributes. If so, this method must be discovered ;

The object
and method
of the
inquiry.

402 a

ἂν εἴη τὴν μέθοδον ταύτην. εἰ δὲ μὴ ἔστι μία
 τις καὶ κοινὴ μέθοδος περὶ τὸ τί ἔστιν, ἔτι χαλε-
 πώτερον γίνεται τὸ πραγματευθῆναι. δεῖσει γὰρ
 λαβεῖν περὶ ἕκαστον τίς ὁ τρόπος, εἰ δὲ φανερόν
 20 ἦ, πότερον ἀπάδειξις τίς ἔστιν ἢ διαίρεσις ἢ καί
 τις ἄλλη μέθοδος, ἔτι¹ πολλὰς ἀπορίας ἔχει καὶ
 πλάνας, ἐκ τίνων δεῖ ζητεῖν. ἄλλαι γὰρ ἄλλων
 ἀρχαί, καθάπερ ἀριθμῶν καὶ ἐπιπέδων.

Πρῶτον δ' ἴσως ἀναγκαῖον διελεῖν ἐν τίνι τῶν
 γενῶν καὶ τί ἔστι, λέγω δὲ πότερον τόδε τι καὶ
 25 οὐσία ἢ ποιὸν ἢ ποσὸν ἢ καὶ τις ἄλλη τῶν διαιρε-
 θεισῶν κατηγοριῶν, ἔτι δὲ πότερον τῶν ἐν δυνάμει
 ὄντων ἢ μᾶλλον ἐντελέχειά τις· διαφέρει γὰρ οὐ τι
 402 b σμικρόν. σκεπτέον δὲ καὶ εἰ μεριστὴ ἢ ἀμερὴς,
 καὶ πότερον ὁμοειδὴς ἅπαντα ψυχὴ ἢ οὐ· εἰ δὲ μὴ
 ὁμοειδὴς, πότερον εἶδει διαφέρουσιν ἢ γένει. νῦν
 μὲν γὰρ οἱ λέγοντες καὶ ζητοῦντες περὶ ψυχῆς
 5 περὶ τῆς ἀνθρωπίνης μόνης εἰκόασιν ἐπισκοπεῖν.
 εὐλαβητέον δ' ὅπως μὴ λανθάνῃ πότερον εἰς ὁ
 λόγος αὐτῆς ἔστί, καθάπερ ζώου, ἢ καθ' ἕκαστον
 ἕτερος, οἶον ἵππου, κυνός, ἀνθρώπου, θεοῦ· τὸ δὲ
 ζῶον τὸ καθόλου ἦτοι οὐθέν ἔστιν ἢ ὕστερον.
 ὁμοίως δὲ καὶ εἴ τι κοινὸν ἄλλο κατηγοροῖτο. ἔτι
 δ' εἰ μὴ πολλαὶ ψυχαὶ ἀλλὰ μόρια, πότερον δεῖ

¹ μέθοδος. ἔτι δὲ B.

^a *Division.* Plato used and perhaps invented this method of forming a concept. If, for instance, you divide the term "living creature" into "footed" and "footless," and "footed" again into "biped" and "quadruped," and so on, you will after many such divisions and subdivisions form a clear concept of the meaning of "living creature." A. objects (*Post. An.* 11, c. 7, 92 b 5) to the method on several grounds, one being that such division presupposes the existence of the concept.

ON THE SOUL, I. 1.

but if there is no one common method of inquiry into real existence, our handling of the subject becomes still more difficult. For we shall be obliged to establish the proper method in each individual case ; and, even if this is patent, whether syllogistic demonstration, or division,^a or some other method is the right one, there is still room for confusion and error as to the premisses from which we must start the inquiry ; for the premisses of all subjects are not the same ; for instance those of arithmetic and those of plane geometry are different.

Perhaps our first business is to determine to what genus the soul belongs, and what it is ; I mean whether it is some particular thing and has real existence or whether it is a quality, or quantity, or belongs to any other of our pre-established categories, and furthermore, whether it has potential or actual existence. For this makes no small difference. In the second place we must inquire whether it has parts or not, and whether every soul is of the same kind or not ; and if not, whether the difference is one of species or of genus. For speakers and inquirers about the soul seem to-day to confine their inquiries to the soul of man. But one must be careful not to evade the question whether one definition of " soul " is enough, as we can give one definition of " living creature," or whether there must be a different one for each soul ; that is, one of the horse, one of the dog, one of man, and one of God, and whether the words " living creature " as a common term have no meaning, or logically come later. This question can of course be raised about any common term. Further, supposing that there are not many kinds of soul, but only parts, are we to inquire first

To what
category
does the
soul belong?

402 b

- 10 ζητεῖν πρότερον τὴν ὅλην ψυχὴν ἢ τὰ μόρια.
χαλεπὸν δὲ καὶ τούτων διορίσαι ποῖα πέφυκεν
ἕτερα ἀλλήλων, καὶ πότερον τὰ μόρια χρὴ ζητεῖν
πρότερον ἢ τὰ ἔργα αὐτῶν, οἷον τὸ νοεῖν ἢ τὸν
νοῦν καὶ τὸ αἰσθάνεσθαι ἢ τὸ αἰσθητικόν· ὁμοίως
δὲ καὶ ἐπὶ τῶν ἄλλων. εἰ δὲ τὰ ἔργα πρότερον,
15 πάλιν ἂν τις ἀπορήσειεν εἰ τὰ ἀντικείμενα πρότερον
τούτων ζητητέον, οἷον τὸ αἰσθητὸν τοῦ αἰσθητικοῦ
καὶ τὸ νοητὸν τοῦ νοητικοῦ. ἔοικε δ' οὐ μόνον
τὸ τί ἐστι γινῶναι χρήσιμον εἶναι πρὸς τὸ θεωρῆσαι
τὰς αἰτίας τῶν συμβεβηκότων ταῖς οὐσίαις, ὥσπερ
ἐν τοῖς μαθήμασι τί τὸ εὐθὺ καὶ καμπύλον ἢ τί
20 γραμμὴ καὶ ἐπίπεδον πρὸς τὸ κατιδεῖν πόσαις
ὀρθαῖς αἰ τοῦ τριγώνου γωνίαι ἴσαι, ἀλλὰ καὶ
ἀνάπαλιν τὰ συμβεβηκότα συμβάλλεται μέγα μέρος
πρὸς τὸ εἰδέναι τὸ τί ἐστίν· ἐπειδὴν γὰρ ἔχωμεν
ἀποδιδόναι κατὰ τὴν φαντασίαν περὶ τῶν συμ-
βεβηκότων, ἢ πάντων ἢ τῶν πλείστων, τότε καὶ
25 περὶ τῆς οὐσίας ἔξομεν λέγειν κάλλιστα· πάσης
γὰρ ἀποδείξεως ἀρχὴ τὸ τί ἐστίν, ὥστε καθ' ὅσους
403 a τῶν ὀρισμῶν μὴ συμβαίνει τὰ συμβεβηκότα γνωρί-
ζειν, ἀλλὰ μηδ' εἰκάσαι περὶ αὐτῶν εὐμαρές, δηλὸν
ὅτι διαλεκτικῶς εἴρηνται καὶ κενῶς ἅπαντες.

Ἀπορίαν δ' ἔχει καὶ τὰ πάθη τῆς ψυχῆς, πότερόν
ἐστὶ πάντα κοινὰ καὶ τοῦ ἔχοντος ἢ ἐστί τι καὶ

ON THE SOUL, I. 1.

into the soul as a whole or the several parts? Here again it is difficult to determine the nature of the differences, one from the other, and whether we should inquire first into the parts of the soul, or their functions; for example, into the thinking or into that which thinks, into sensation or into that which feels; and a similar difficulty arises with all the other parts. If we are to take the functions first, a further problem may arise; whether we should consider the objects corresponding to them before the parts themselves—I mean, the thing felt before the part of the soul which feels it, and the thing thought before the mind which thinks it. A knowledge of what a thing is is of course a valuable assistance towards the examination of the causes of the attributes contingent upon its essence; for instance, in mathematics, to know the meaning of “straight,” “curved,” “line,” and “plane figure” helps to determine the number of right-angles to which the angles of a triangle are equal. But the converse is also true; the accidental properties contribute materially to the knowledge of what a thing is. For when we are in a position to expound all or most of the accidental properties as presented to us, we shall also be best qualified to speak about the essence. For the essential quality of a thing is the starting-point for a demonstration, and definitions which do not enable us to know the accidental properties, nor even to make a tolerable guess about them, are clearly laid down merely for argument’s sake and are utterly valueless.

The affections of the soul present a further difficulty—Are they all associated with that which contains the soul, or is any of them peculiar to the soul

and how shall we approach the analysis?

Relations of soul and body.

⁵ τῆς ψυχῆς ἴδιον αὐτῆς· τοῦτο γὰρ λαβεῖν μὲν ἀναγκαῖον, οὐ ῥάδιον δέ. φαίνεται δὲ τῶν πλείστων οὐθὲν ἄνευ σώματος πάσχειν οὐδὲ ποιεῖν, οἷον ὀργίζεσθαι, θαρρεῖν, ἐπιθυμεῖν, ὅλως αἰσθάνεσθαι. μάλιστα δ' ἔοικεν ἴδιον τὸ νοεῖν· εἰ δ' ἐστὶ καὶ τοῦτο φαντασία τις ἢ μὴ ἄνευ φαντασίας, οὐκ
¹⁰ ἐνδέχεται ἂν οὐδὲ τοῦτ' ἄνευ σώματος εἶναι. εἰ μὲν οὖν ἐστὶ τι τῶν τῆς ψυχῆς ἔργων ἢ παθημάτων ἴδιον, ἐνδέχεται ἂν αὐτὴν χωρίζεσθαι· εἰ δὲ μηθὲν ἐστὶν ἴδιον αὐτῆς, οὐκ ἂν εἴη χωριστή, ἀλλὰ καθάπερ τῷ εὐθεί, ἢ εὐθύ, πολλὰ συμβαίνει, οἷον ἅπτεσθαι τῆς χαλκῆς σφαίρας κατὰ στιγμήν, οὐ
¹⁵ μέντοι γ' ἄψεται τούτου χωρισθὲν τὸ εὐθύ· ἀχωριστον γάρ, εἴπερ αἰετὶ μετὰ σώματός τινός ἐστιν. ἔοικε δὲ καὶ τὰ τῆς ψυχῆς πάθη πάντα εἶναι μετὰ σώματος, θυμός, πραότης, φόβος, ἔλεος, θάρσος, ἔτι χαρὰ καὶ τὸ φιλεῖν τε καὶ μισεῖν· ἅμα γὰρ τούτοις πάσχει τι τὸ σῶμα. μνηύει δὲ τὸ ποτὲ
²⁰ μὲν ἰσχυρῶν καὶ ἐναργῶν παθημάτων συμβαινόντων μηδὲν παροξύνεσθαι ἢ φοβεῖσθαι, ἐνίοτε δ' ὑπὸ μικρῶν καὶ ἁμαυρῶν κινεῖσθαι, ὅταν ὀργῇ τὸ σῶμα καὶ οὕτως ἔχῃ ὥσπερ ὅταν ὀργίζηται. ἔτι δὲ τοῦτο μᾶλλον φανερόν· μηθενὸς γὰρ φοβεροῦ συμβαινόντος ἐν τοῖς πάθεσι γίνονται τοῖς τοῦ φοβου-
²⁵ μένου. εἰ δ' οὕτως ἔχει, δῆλον ὅτι τὰ πάθη λόγοι ἐνυλοὶ εἰσιν. ὥστε οἱ ὄροι τοιούτοι. οἷον τὸ ὀργίζεσθαι κίνησίς τις τοῦ τοιουδὲ σώματος ἢ μέρους

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itself? This question must be faced, but its solution is not easy. In most cases it seems that none of the affections, whether active or passive, can exist apart from the body. This applies to anger, enthusiasm, desire and sensation generally, though possibly thinking is an exception. But if this is also some form of activity stimulated by sense impression, or at least cannot exist without such activity, it cannot exist apart from the body. If then any function or affection of the soul is peculiar to it, it can be separated from the body; but if there is nothing peculiar to the soul it cannot be separated. In the same way there are many accidental properties belonging to straight, *qua* straight, as, for instance, that a straight line touches a bronze sphere at a point, yet if separated, the straight line will not so touch. It is in fact inseparable, if it is always associated with some body. Probably all the affections of the soul are associated with the body—anger, gentleness, fear, pity, courage and joy, as well as loving and hating; for when they appear the body is also affected. There is good evidence for this. Sometimes no irritation or fear is expressed, though the provocations are strong and obvious; and conversely, small and obscure causes produce movement, when the body is disposed to anger, and when it is in an angry mood. And here is a still more obvious proof. There are times when men show all the symptoms of fear without any cause of fear being present. If this is the case, then clearly the affections of the soul are ideas expressed in matter. Their definitions therefore must be in harmony with this; for instance, anger must be defined as a movement made by a body in a particular state, or by a part, or by a capacity of

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403 a ἢ δυνάμειος ὑπὸ τοῦδε ἔνεκα τοῦδε. καὶ διὰ ταῦτα
 ἤδη φυσικοῦ τὸ θεωρῆσαι περὶ ψυχῆς, ἢ πάσης ἢ
 τῆς τοιαύτης. διαφερόντως δ' ἂν ὀρίσαιντο φυσικός
 30 τε καὶ διαλεκτικός ἕκαστον αὐτῶν, οἷον ὀργὴ τί
 ἐστίν· ὁ μὲν γὰρ ὀρεξίν ἀντιλυπήσεως ἢ τι τοιοῦτον,
 403 b ὁ δὲ ζέσιν τοῦ περὶ καρδίαν αἵματος καὶ θερμοῦ.
 τούτων δὲ ὁ μὲν τὴν ὕλην ἀποδίδωσιν, ὁ δὲ τὸ
 εἶδος καὶ τὸν λόγον. ὁ μὲν γὰρ λόγος εἶδος τοῦ
 πράγματος, ἀνάγκη δ' εἶναι τοῦτον ἐν ὕλῃ τοιαδί,
 εἰ ἔσται, ὥσπερ οἰκίας ὁ μὲν λόγος τοιοῦτος, ὅτι
 5 σκέπασμα κωλυτικὸν φθορᾶς ὑπ' ἀνέμων καὶ
 ὄμβρων καὶ καυμάτων, ὁ δὲ φήσει λίθους καὶ
 πλίνθους καὶ ξύλα, ἕτερος δ' ἐν τούτοις τὸ εἶδος,
 ἔνεκα τωνδὶ. τίς οὖν ὁ φυσικὸς τούτων; πότερον
 ὁ περὶ τὴν ὕλην, τὸν δὲ λόγον ἀγνοῶν, ἢ ὁ περὶ
 τὸν λόγον μόνον; ἢ μᾶλλον ὁ ἐξ ἀμφυῖν; ἐκείνων
 10 δὲ δὴ τίς ἐκάτερος; ἢ οὐκ ἔστι τις ὁ περὶ τὰ
 πάθη τῆς ὕλης τὰ μὴ χωριστά, μηδ' ἢ χωριστά,
 ἀλλ' ὁ φυσικὸς περὶ ἅπαιθ' ὅσα τοῦ τοιουδὶ
 σώματος καὶ τῆς τοιαύτης ὕλης ἔργα καὶ πάθη.
 ὅσα¹ δὲ μὴ ἢ τοιαῦτα, ἄλλος, καὶ περὶ τινῶν
 μὲν τεχνίτης, ἐὰν τύχη, οἷον τέκτων ἢ ἱατρός,
 τῶν δὲ μὴ χωριστῶν μὲν, ἢ δὲ μὴ τοιούτου

¹ ὅποσα B.

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such a body roused by such a cause, with such an end in view. For this reason it immediately becomes the business of the philosopher to inquire into the soul, either every soul, or at least a soul from this point of view. But the natural philosopher and the logician will offer different definitions in answer to the question what is anger. The latter will call it a craving for retaliation, or something of the sort, while the former will describe it as a surging of the blood round the heart and a form of heat. The one is describing the matter, the other the form, that is the idea implied. For this implied idea is the form of the thing, and if it is to exist, it must appear in matter of such a kind. To illustrate this : the idea of a house is a covering to protect from damage by wind, rain and heat. But another will mean by a house stones, bricks and timber ; and another again will mean the form expressed in these materials to achieve these objects. Now which of these is really the natural philosopher ? The man who ignores the form and is only concerned with the matter, or the man who is only concerned with the idea implied ? Probably the man who bases his concept on both. What then are we to say of the other two ? Perhaps there is no one who treats of the affections of the soul which are inseparable, or in so far as they are inseparable ^a ; but the natural philosopher's concern is with all the functions and affections of the body, and of matter in such a state ; whatever is not in such a state is the business of another ; in some subjects it is the business of the craftsman, the carpenter, it may be, or the physician ; but inseparables in so far as they are not affections of the body in such a state,

^a *i.e.* from the body.

403 b

15 σώματος πάθη καὶ ἐξ ἀφαιρέσεως, ὁ μαθηματικός, ἥ δὲ κεχωρισμένα, ὁ πρῶτος φιλόσοφος.

Ἄλλ' ἐπανιτέον ὅθεν ὁ λόγος. ἐλέγομεν δ' ὅτι τὰ πάθη τῆς ψυχῆς ἀχώριστα τῆς φυσικῆς ὕλης τῶν ζώων, ἥ δὲ τοιαῦθ' ὑπάρχει, θυμὸς καὶ φόβος, καὶ οὐχ ὥσπερ γραμμὴ καὶ ἐπίπεδον.

20 II. Ἐπισκοποῦντας δὲ περὶ ψυχῆς ἀναγκαῖον ἅμα διαποροῦντας περὶ ὧν εὐπορεῖν δεῖ, προελθούτας τὰς τῶν προτέρων δόξας συμπαραλαμβάνειν ὅσοι τι περὶ αὐτῆς ἀπεφάναντο, ὅπως τὰ μὲν καλῶς εἰρημένα λάβωμεν, εἰ δέ τι μὴ καλῶς, τοῦτ' εὐ-

25 λαβηθῶμεν. ἀρχὴ δὲ τῆς ζητήσεως προθέσθαι τὰ μάλιστα δοκοῦνθ' ὑπάρχειν αὐτῇ κατὰ φύσιν. τὸ ἔμψυχον δὴ τοῦ ἀψύχου δυοῖν μάλιστα διαφέρειν δοκεῖ, κινήσει τε καὶ τῷ αἰσθάνεσθαι. παρειλήφαμεν δὲ καὶ παρὰ τῶν προγενεστέρων σχεδὸν δύο ταῦτα περὶ ψυχῆς· φασὶ γὰρ ἔνιοι καὶ μάλιστα καὶ πρῶτως ψυχὴν εἶναι τὸ κινεῖν. οἰηθέντες δὲ

30 τὸ μὴ κινούμενον αὐτὸ μὴ ἐνδέχεσθαι κινεῖν ἕτερον, τῶν κινουμένων τι τὴν ψυχὴν ὑπέλαβον εἶναι.

404 a ὅθεν Δημόκριτος μὲν πῦρ τι καὶ θερμόν φησιν αὐτὴν εἶναι· ἀπείρων γὰρ ὄντων σχημάτων καὶ ἀτόμων τὰ σφαιροειδῆ πῦρ καὶ ψυχὴν λέγει, οἷον ἐν τῷ ἀέρι τὰ καλούμενα ξύσματα, ἃ φαίνεται ἐν ταῖς διὰ τῶν θυρίδων ἀκτίσιν, ὧν τὴν πανσπερμίαν

^a i.e. the Metaphysician.

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that is, in the abstract, are the province of the mathematician, and in so far as they are separable are the sphere of the First Philosopher.^a

But we must now return to the point from which our digression started. We were saying that the affections of the soul, such as anger and fear, are inseparable from the matter of living things in which their nature is manifested, and are not separable like a line and a plane figure.

II. In our inquiry about the soul we shall have to raise problems for which we must find a solution, and in our progress we must take with us for comparison the theories expounded by our predecessors, in order that we may adopt those which are well stated, and be on our guard against any which are unsatisfactory. But our inquiry must begin by laying down in advance those things which seem most certainly to belong to the soul by nature. There are two qualities in which that which has a soul seems to differ radically from that which has not; these are movement and sensibility. We have practically accepted these two distinguishing characteristics of the soul from our predecessors. Some say that capacity to produce movement is first and foremost the characteristic of the soul. But because they believe that nothing can produce movement which does not itself move, they have supposed that the soul is one of the things which move. On this supposition Democritus argues that the soul is fire in some sense and heat. For forms and atoms being countless, he calls the spherical ones fire and soul, like what are called particles in the air, which can be seen when the sunbeams pass through our windows; the whole collection of which he calls the elements of which all nature is composed.

Previous theories as to the nature of the soul.

404 a

- ⁵ στοιχεῖα λέγει τῆς ὅλης φύσεως. ὁμοίως δὲ καὶ
 Λεύκιππος. τούτων δὲ τὰ σφαιροειδῆ ψυχὴν, διὰ
 τὸ μάλιστα διὰ παντὸς δύναισθαι διαδύνειν τοὺς
 τοιούτους ῥυσμούς, καὶ κινεῖν τὰ λοιπὰ κινούμενα
 καὶ αὐτά, ὑπολαμβάνοντες τὴν ψυχὴν εἶναι τὸ
 παρέχον τοῖς ζώοις τὴν κίνησιν. διὸ καὶ τοῦ ζῆν
¹⁰ ὄρον εἶναι τὴν ἀναπνοήν· συνάγοντος γὰρ τοῦ
 περιέχοντος τὰ σώματα, καὶ ἐκθλίβοντος τῶν
 σχημάτων τὰ παρέχοντα τοῖς ζώοις τὴν κίνησιν
 διὰ τὸ μηδ' αὐτὰ ἡρεμεῖν μηδέποτε, βοήθειαν
 γίνεσθαι θύραθεν ἐπεισιόντων ἄλλων τοιούτων ἐν
 τῷ ἀναπνεῖν· κωλύειν γὰρ αὐτὰ καὶ τὰ ἐνυπάρ-
¹⁵ χοντα ἐν τοῖς ζώοις ἐκκρίνεσθαι, συνανείργοντα τὸ
 συνάγον καὶ πηγνύον· καὶ ζῆν δὲ ἕως ἂν δύνωνται
 τοῦτο ποιεῖν. ἔοικε δὲ καὶ τὸ παρὰ τῶν Πυθ-
 αγορείων λεγόμενον τὴν αὐτὴν ἔχειν διάνοιαν·
 ἔφασαν γάρ τινες αὐτῶν ψυχὴν εἶναι τὰ ἐν τῷ ἀέρι
 ξύσματα, οἱ δὲ τὸ ταῦτα κινοῦν. περὶ δὲ τούτων
²⁰ εἴρηται, διότι συνεχῶς φαίνεται κινούμενα, καὶ ἢ
 νηνεμία παντελῆς. ἐπὶ ταῦτόν δὲ φέρονται καὶ ὅσοι
 λέγουσι τὴν ψυχὴν τὸ αὐτὸ κινοῦν· εἰκότασι γὰρ
 οὗτοι πάντες ὑπειληφέναι τὴν κίνησιν οἰκειότατον
 εἶναι τῇ ψυχῇ, καὶ τὰ μὲν ἄλλα πάντα κινεῖσθαι
 διὰ τὴν ψυχὴν, ταύτην δ' ὑφ' ἑαυτῆς, διὰ τὸ μηθὲν
²⁵ ὁρᾶν κινοῦν ὃ μὴ καὶ αὐτὸ κινεῖται.

Ὅμοίως δὲ καὶ Ἀναξαγόρας ψυχὴν εἶναι λέγει
 τὴν κινουῦσαν, καὶ εἴ τις ἄλλος εἴρηκεν ὡς τὸ πᾶν

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And Leucippus adopts a similar position. It is the spherical atoms which they call the soul, because such shapes can most readily pass through anything, and can move other things by virtue of their own motion, supposing, as they do, that the soul is that which imparts motion to living things. They consider that this is why respiration is the essential condition of life ; for the surrounding atmosphere exerts pressure upon bodies and thus forces out the atoms which produce movement in living things, because they themselves are never at rest. The resulting shortage is reinforced from outside, when other similar atoms enter in the act of breathing ; for they prevent the atoms which are in the bodies at the time from escaping by checking the compression and the hardening (caused by the surrounding atmosphere) ; and animals can live just so long as they are competent to do this. The theory handed down from the Pythagoreans seems to mean the same thing ; for some of them have declared that the soul is identical with the particles in the air, and others with what makes these particles move. The identity of these particles with the soul has been alleged because they can be seen perpetually in motion even when the air is completely calm. Those who say that the soul is that which moves itself tend towards the same view. For they all seem to assume that movement is the distinguishing characteristic of the soul, and that everything else owes its movement to the soul, which they suppose to be self-moved, because they see nothing producing movement which does not itself move.

In the same way Anaxagoras says that the soul is Anaxagoras.
the producer of movement, and any other who has

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404 a ἐκίνησε νοῦς, οὐ μὴν παντελῶς γ' ὥσπερ Δημόκριτος. ἐκεῖνος μὲν γὰρ ἀπλῶς ταυτὸν ψυχὴν καὶ νοῦν· τὸ γὰρ ἀληθὲς εἶναι τὸ φαινόμενον· διὸ
30 καλῶς ποιῆσαι τὸν Ὅμηρον ὡς "Ἐκτωρ κέϊτ' ἄλλοφρονέων." οὐ δὴ χρήται τῷ νῷ ὡς δυνάμει τινὶ περὶ τὴν ἀλήθειαν, ἀλλὰ ταυτὸ λέγει ψυχὴν καὶ νοῦν.

404 b Ἀναξαγόρας δ' ἦττον διασαφεῖ περὶ αὐτῶν· πολλαχοῦ μὲν γὰρ τὸ αἴτιον τοῦ καλῶς καὶ ὀρθῶς τὸν νοῦν λέγει, ἐτέρωθι δὲ τοῦτον εἶναι τὴν ψυχὴν· ἐν ἅπασιν γὰρ ὑπάρχειν αὐτὸν τοῖς ζώοις, καὶ
5 μεγάλοις καὶ μικροῖς, καὶ τιμίοις καὶ ἀτιμοτέροις. οὐ φαίνεται δ' ὅ γε κατὰ φρόνησιν λεγόμενος νοῦς πᾶσιν ὁμοίως ὑπάρχειν τοῖς ζώοις, ἀλλ' οὐδὲ τοῖς ἀνθρώποις πᾶσιν.

Ὅσοι μὲν οὖν ἐπὶ τὸ κινεῖσθαι τὸ ἔμψυχον ἀπέβλεψαν, οὗτοι τὸ κινητικώτατον ὑπέλαβον τὴν ψυχὴν· ὅσοι δ' ἐπὶ τὸ γινώσκειν καὶ τὸ αἰσθάνεσθαι
10 τῶν ὄντων, οὗτοι δὲ λέγουσι τὴν ψυχὴν τὰς ἀρχάς, οἱ μὲν πλείους ποιοῦντες, οἱ δὲ μίαν ταύτην, ὥσπερ Ἐμπεδοκλῆς μὲν ἐκ τῶν στοιχείων πάντων, εἶναι δὲ καὶ ἕκαστον ψυχὴν τούτων, λέγων οὕτω

γαίῃ μὲν γὰρ γαῖαν ὀπάπαμεν, ὕδατι δ' ὕδωρ, αἰθέρι δ' αἰθέρα διᾶν, ἀτὰρ πυρὶ πῦρ αἰδηλον,
15 στοργῇ δὲ στοργήν, νεῖκος δέ τε νεϊκεῖ λυγρῷ.

τὸν αὐτὸν δὲ τρόπον καὶ Πλάτων ἐν τῷ Τιμαίῳ τὴν ψυχὴν ἐκ τῶν στοιχείων ποιεῖ· γινώσκεισθαι γὰρ τῷ ὁμολῶ τὸ ὅμοιον, τὰ δὲ πράγματα ἐκ τῶν ἀρχῶν εἶναι. ὁμοίως δὲ καὶ ἐν τοῖς περὶ φιλοσοφίας

^a Because on D.'s theory the dying Hector's delusions are true.

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laid it down that the mind is responsible for all movement, though not in every case, as Democritus said ; for he actually identified the soul and the mind ; for he believes that what appears to one is the truth. Hence he regards Homer's description of Hector in his swooning as " lying thinking other thoughts " as accurate.^a He does not then employ the term mind as a faculty concerned with the truth, but identifies the soul and the mind.

Anaxagoras is less precise in his dealing with the subject ; for on many occasions he speaks of the mind as responsible for what is right and correct, but at others he says that this is the soul : for the mind he regards as existing in all living things, great and small, noble and base ; but the mind in the sense of intelligence does not appear to belong to all living things alike, and not even to all men.

Those then who have interpreted the soul in terms of motion have regarded the soul as most capable of producing movement. But those who have referred it to cognition and perception regard the soul as the first beginning of all things—some regarding this first beginning as plural and some as singular. Empedocles, for instance, thought that the soul was composed of all the elements, and yet considered each of these to be a soul. He says :

By Earth we see Earth, by Water Water,
By Air the divine Air, by Fire destroying Fire,
Love by Love, and Strife by bitter Strife.

In the same way, in the *Timaeus*, Plato constructs the soul out of the elements. For he maintains that " like " can only be known by " like," and that from these first beginnings grow the things which we perceive. A similar definition is laid down in his

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20 λεγομένοις διωρίσθη, αὐτὸ μὲν τὸ ζῶον ἐξ αὐτῆς
 τῆς τοῦ ἐνὸς ιδέας καὶ τοῦ πρώτου μήκους καὶ
 πλάτους καὶ βάθους, τὰ δ' ἄλλα ὁμοιοτρόπως.
 ἔτι δὲ καὶ ἄλλως, νοῦν μὲν τὸ ἔν, ἐπιστήμην δὲ
 τὰ δύο· μοναχῶς γὰρ ἐφ' ἑν' τὸν δὲ τοῦ ἐπιπέδου
 ἀριθμὸν δόξαν, αἰσθησιν δὲ τὸν τοῦ στερεοῦ· οἱ
 25 μὲν γὰρ ἀριθμοὶ τὰ εἶδη αὐτὰ καὶ αἱ ἀρχαὶ ἐλέγοντο,
 εἰσὶ δ' ἐκ τῶν στοιχείων. κρίνεται δὲ τὰ πράγματα
 τὰ μὲν ἰῶ, τὰ δ' ἐπιστήμη, τὰ δὲ δόξη, τὰ δ'
 αἰσθήσει· εἶδη δ' οἱ ἀριθμοὶ οὗτοι τῶν πραγμάτων.

Ἐπεὶ δὲ καὶ κινητικὸν ἐδόκει ἡ ψυχὴ εἶναι καὶ
 γνωριστικόν, οὕτως ἔνιοι συνέπλεξαν· ἐξ ἀμφοῖν,
 30 ἀποφηνάμενοι τὴν ψυχὴν ἀριθμὸν κινεῖνθ' ἑαυτόν.
 διαφέρονται δὲ περὶ τῶν ἀρχῶν, τίνες καὶ πόσαι,
 μάλιστα μὲν οἱ σωματικὰς ποιοῦντες τοῖς ἀσω-
 405 a μάτους,¹ τούτοις δ' οἱ μίξαντες καὶ ἀπ' ἀμφοῖν τὰς
 ἀρχὰς ἀποφηνάμενοι. διαφέρονται δὲ καὶ περὶ τὸ
 πλῆθος· οἱ μὲν γὰρ μίαν οἱ δὲ πλείους λέγουσιν.
 ἐπομένως δὲ τούτοις καὶ τὴν ψυχὴν ἀποδιδόασιν·

¹ ἀσωμάτοις B.

^a This difficult passage gives Aristotle's interpretation of Plato's theory of Ideas, as applied to the origin of the universe. We know of no treatise of Plato *About Philosophy*, but tradition ascribes the reference to some lecture notes of Plato to which Aristotle had access. According to this theory Pure Knowledge has some object corresponding to it; this object is not the world of Sense, but the world of Ideas. All the sensible world is thus but an imperfect copy of this world of Ideas. There is, for instance, in the world of Ideas an Idea Beauty. Objects in the world of Sense are beautiful only in so far as they are copies of this. But the world of Ideas includes the Ideas of numbers and, according to the theory Aristotle is discussing, from these are derived some

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comments *About Philosophy*, where he maintains that the living universe is derived from the idea of the One, primary length from the ideal number Two, primary breadth from the ideal number Three, and primary depth from the ideal number Four, and all the rest in the same way. But there is a further explanation that mind is One and knowledge Two. For there is only one straight line from one point to another. So the number of the plane figure (Three) is opinion, and the number of the cube (Four) is perception. For numbers are alleged to be their forms and ultimate principles, but they are composed of the elements.^a The sensible world is apprehended in some cases by mind, in others by knowledge, in others again by opinion, and in others by perception; but these numbers are the forms of things.

But since the soul appears to contain an element which produces movement and one which produces knowledge, so some thinkers have constructed it from both, explaining the soul as a number moving itself. But men differ about the first beginnings of things, both as to their nature and quantity, especially those who make them corporeal from those who make them incorporeal, and from both these differ those who combine the two and explain the ultimate principles as compounded of both. They differ again about the number, some alleging that there is one, and others more than one. The account they give of the soul in each case follows their conclusions;

of our concepts. One was not considered by the Greeks as a number, but only as the fountain of all numbers. So the three dimensions are derived from the numbers 2, 3, and 4 respectively. As "like" is known by "like," there are similarly in the soul faculties corresponding to these. So mind corresponds to One, Knowledge to Two, and so on.

405 a

· 5 τό τε γὰρ κινητικὸν τὴν φύσιν τῶν πρώτων ὑπελήφασιν, οὐκ ἀλόγως. ὅθεν ἔδοξέ τισι πῦρ εἶναι· καὶ γὰρ τοῦτο λεπτομερέστατόν τε καὶ μάλιστα τῶν στοίχείων ἀσώματον, ἔτι δὲ κινεῖται τε καὶ κινεῖ τὰ ἄλλα πρώτως. Δημόκριτος δὲ καὶ γλαφυρωτέρως εἶρηκεν ἀποφηνάμενος διὰ τί τούτων ἐκάτερον· ψυχὴν μὲν γὰρ εἶναι ταῦτό καὶ νοῦν, 10 τοῦτο δ' εἶναι τῶν πρώτων καὶ ἀδιαιρέτων σωμάτων, κινητικὸν δὲ διὰ μικρομέρειαν καὶ τὸ σχῆμα· τῶν δὲ σχημάτων εὐκινητότατον τὸ σφαιροειδὲς λέγει· τοιοῦτον δ' εἶναι τὸν τε νοῦν καὶ τὸ πῦρ.

Ἀναξαγόρας δ' ἔοικε μὲν ἕτερον λέγειν ψυχὴν τε καὶ νοῦν, ὥσπερ εἶπομεν καὶ πρότερον, 15 δ' ἀμφοῖν ὡς μιᾷ φύσει, πλὴν ἀρχὴν γε τὸν νοῦν τίθεται μάλιστα πάντων· μόνον γοῦν φησὶν αὐτὸν τῶν ὄντων ἀπλοῦν εἶναι καὶ ἀμιγῆ τε καὶ καθαρὸν. ἀποδίδωσι δ' ἀμφω τῇ αὐτῇ ἀρχῇ, τό τε γινώσκειν καὶ τὸ κινεῖν, λέγων νοῦν κινῆσαι τὸ πᾶν. ἔοικε 20 δὲ καὶ Θαλῆς ἐξ ὧν ἀπομνημονεύουσι κινητικὸν τι τὴν ψυχὴν ὑπολαβεῖν, εἶπερ τὸν λίθον ἔφη ψυχὴν ἔχειν, ὅτι τὸν σίδηρον κινεῖ. Διογένης δ' ὥσπερ καὶ ἕτεροί τινες, ἀέρα τοῦτον οἰηθεῖς πάντων λεπτομερέστατον εἶναι καὶ ἀρχὴν· καὶ διὰ τοῦτο γινώσκειν τε καὶ κινεῖν τὴν ψυχὴν, ἥ μὲν πρῶτόν ἐστι, καὶ ἐκ τούτου τὰ λοιπά, γινώσκειν, ἥ δὲ 25 λεπτότατον, κινητικὸν εἶναι. καὶ Ἡράκλειτος δὲ τὴν ἀρχὴν εἶναι φησι ψυχὴν, εἶπερ τὴν ἀναθυμίασιν,

^a i.e. "the Magnesian stone," or, as we call it, the magnet.

ON THE SOUL, I. II.

for they consider the soul to be that first cause, which by its own nature produces movement ; and this is not unreasonable. And so some have thought the soul to be fire ; for this is composed of the lightest constituents, and of all the elements is the nearest to incorporeal, but it also moves and is a primary cause of movement in other things. Democritus has explained with greater precision why each of these two things is so ; for he identifies the soul and the mind. This, he says, consists of primary and indivisible bodies, and its power of producing movement is due to the smallness of its parts and its shape ; for he calls the spherical the most easily moved of all shapes ; and this characteristic is shared by mind and fire. Democritus.

Anaxagoras indeed seems to regard soul and mind as different, as we have said before, but he treats them both as of one nature, except that he regards mind as above all things the ultimate principle ; at any rate, he speaks of it as the only existing thing which is simple, unmixed, and pure. But he assigns both the power of knowing and of moving to the same principle when he says that the mind moves everything. Thales too, judging from what men recall of his work, seems to suppose that the soul is in a sense the cause of movement, since he says that a stone^a has a soul because it causes movement to iron. Diogenes and some others think that the soul is air, regarding this as having the lightest parts of all things, and as an ultimate principle ; for this reason he believes that the soul both knows and causes movement ; it knows because it is primary and from it all else comes ; it causes movement because of its extreme lightness. Heracleitus also calls the soul the first beginning, as the emanation from which Anaxagoras. Thales. Diogenes. Heracleitus.

405 a

ἐξ ἧς τᾶλλα συνίστησιν· καὶ ἄσωματώτατον δὴ
καὶ ῥέον αἰεί· τὸ δὲ κινούμενον κινουμένῳ γινώ-
σκεσθαι. ἐν κινήσει δ' εἶναι τὰ ὄντα καὶ κείνους
ᾤετο καὶ οἱ πολλοί. παραπλησίως δὲ τούτοις
30 καὶ Ἀλκμαίων ἔοικεν ὑπολαβεῖν περὶ ψυχῆς· φησὶ
γὰρ αὐτὴν ἀθάνατον εἶναι διὰ τὸ εἰκέναι τοῖς
ἀθανάτοις, τοῦτο δ' ὑπάρχειν αὐτῇ ὡς αἰεὶ κινου-
μένη· κινεῖσθαι γὰρ καὶ τὰ θεῖα πάντα συνεχῶς
405 b αἰεί, σελήνην, ἥλιον, τοὺς ἀστέρας καὶ τὸν οὐρανὸν
ὅλον. τῶν δὲ φορτικωτέρων καὶ ὕδωρ τινὲς ἀπ-
εφῆναντο, καθάπερ Ἴππων. πεισθῆναι δ' εἰκόασιν
ἐκ τῆς γονῆς, ὅτι πάντων ὑγρά· καὶ γὰρ ἐλέγχει
5 τοὺς αἷμα φάσκοντας τὴν ψυχὴν, ὅτι ἡ γονὴ οὐχ
αἷμα· ταύτην δ' εἶναι τὴν πρώτην ψυχὴν. ἕτεροι
δ' αἷμα, καθάπερ Κριτίας, τὸ αἰσθάνεσθαι ψυχῆς
οἰκειότατον ὑπολαμβάνοντες, τοῦτο δ' ὑπάρχειν
διὰ τὴν τοῦ αἵματος φύσιν. πάντα γὰρ τὰ στοιχεῖα
κριτὴν εἴληφε, πλὴν τῆς γῆς· ταύτην δ' οὐθεὶς
10 ἀποπέφανται, πλὴν εἴ τις αὐτὴν εἴρηκεν ἐκ πάντων
εἶναι τῶν στοιχείων ἢ πάντα.

Ὅρίζονται δὲ πάντες τὴν ψυχὴν τρισὶν ὡς εἰπεῖν,
κινήσει, αἰσθήσει, τῷ ἄσωμάτῳ· τούτων δ' ἕκαστον
ἀνάγεται πρὸς τὰς ἀρχάς. διὸ καὶ οἱ τῷ γινώσκειν
ὀριζόμενοι αὐτὴν ἢ στοιχεῖον ἢ ἐκ τῶν στοιχείων
ποιοῦσι, λέγοντες παραπλησίως ἀλλήλοις, πλὴν
15 ἐνός· φασὶ γὰρ γινώσκεσθαι τὸ ὅμοιον τῷ ὁμοίῳ·
ἐπειδὴ γὰρ ἡ ψυχὴ πάντα γινώσκει, συνιστᾷσιν
αὐτὴν ἐκ πασῶν τῶν ἀρχῶν. ὅσοι μὲν οὖν μίαν
τινὰ λέγουσιν αἰτίαν καὶ στοιχεῖον ἓν, καὶ τὴν

a Empedocles.

b Anaxagoras.

ON THE SOUL, I. II.

he constructs all other things : it is incorporeal and always in a state of flux : he and many others supposed that a thing moving can only be known by something which moves, and all that exists is in motion. Alcmaeon's suppositions about the soul are somewhat similar to these ; for he says it is immortal, because it resembles the immortals, and that this characteristic is due to its perpetual motion ; for things divine are in a state of perpetual motion, the moon, the sun, the stars, and the whole heavens. Some of the less exact thinkers like Hippon have declared the soul to be water. This belief seems to arise from the fact that the seed of all things is moist. For he rebuts those who say that the soul is blood, on the ground that the seed is not blood ; but he says that the first soul is seed. Others like Critias have imagined the soul to be blood, because they have supposed perceptiveness to be the peculiar characteristic of the soul, and that this is due to the nature of blood. In fact each of the elements in turn has found a supporter, except earth ; but this no one has suggested except in so far as one^a has said that the soul is composed of, or is identical with, all the elements.

But all, or almost all, distinguish the soul by three of its attributes, movement, perception, and incorporeality ; and each of these leads to the first beginnings. So those who define it by the power of knowing describe it as an element, or as derived from the elements, all arguing with one^b exception on similar lines ; for they say that " like " is known by " like " ; for since everything is known by the soul, they construct it of all the elements. Those, then, who allege that there is only one cause, and but one

405 b

ψυχὴν ἐν τιθέασιν, οἷον πῦρ ἢ ἀέρα· οἱ δὲ πλείους
 λέγοντες τὰς ἀρχὰς καὶ τὴν ψυχὴν πλείω ποιοῦσιν.
 20 Ἀναξαγόρας δὲ μόνος ἀπαθῇ φησὶν εἶναι τὸν νοῦν,
 καὶ κοινὸν οὐθέν οὐθενὶ τῶν ἄλλων ἔχειν. τοιοῦτος
 δ' ὢν πῶς γνωριεῖ καὶ διὰ τίν' αἰτίαν, οὗτ' ἐκεῖνος
 εἴρηκεν οὗτ' ἐκ τῶν εἰρημένων συμφαινές ἐστιν.
 ὅσοι δ' ἐναντιώσεις ποιοῦσιν ἐν ταῖς ἀρχαῖς, καὶ
 τὴν ψυχὴν ἐκ τῶν ἐναντίων συνιστᾶσιν· οἱ δὲ
 25 θάτερον τῶν ἐναντίων, οἷον θερμὸν ἢ ψυχρὸν ἢ τι
 τοιοῦτον ἄλλο, καὶ τὴν ψυχὴν ὁμοίως ἐν τι τούτων
 τιθέασιν. διὸ καὶ τοῖς ὀνόμασιν ἀκολουθοῦσιν, οἱ
 μὲν τὸ θερμὸν λέγοντες, ὅτι διὰ τοῦτο καὶ τὸ ζῆν
 ὠνόμασται, οἱ δὲ τὸ ψυχρὸν διὰ τὴν ἀναπνοὴν καὶ
 τὴν κατάψυξιν καλεῖσθαι ψυχὴν. τὰ μὲν οὖν παρα-
 30 δεδομένα περὶ ψυχῆς, καὶ δι' αἷς αἰτίας λέγουσιν
 οὕτω, ταῦτ' ἐστίν.

III. Ἐπισκεπτέον δὲ πρῶτον μὲν περὶ κινήσεως·
 ἴσως γὰρ οὐ μόνον ψευδὸς ἐστὶ τὸ τὴν οὐσίαν
 408 a αὐτῆς τοιαύτην εἶναι οἷαν φασὶν οἱ λέγοντες ψυχὴν
 εἶναι τὸ κινεῖν ἑαυτὸ ἢ δυνάμενον κινεῖν, ἀλλ' ἐν
 τι τῶν ἀδυνάτων τὸ ὑπάρχειν αὐτῇ κίνησιν. ὅτι
 μὲν οὖν οὐκ ἀναγκαῖον τὸ κινεῖν καὶ αὐτὸ κινεῖσθαι,
 πρότερον εἴρηται. διχῶς δὲ κινουμένου παντός (ἢ
 b γὰρ καθ' ἕτερον ἢ καθ' αὐτό· καθ' ἕτερον δὲ
 λέγομεν, ὅσα κινεῖται τῷ ἐν κινουμένῳ εἶναι, οἷον
 πλωτῆρες· οὐ γὰρ ὁμοίως κινοῦνται τῷ πλοίῳ· τὸ
 μὲν γὰρ καθ' αὐτὸ κινεῖται, οἱ δὲ τῷ ἐν κινουμένῳ

ON THE SOUL, I. II.—III.

element, also make the soul one element, such as fire or air ; but those who believe in more than one first beginning make the soul also plural. Anaxagoras is alone in his belief that the mind cannot be acted upon, and that it has nothing in common with anything else. But how the mind being thus constructed can ever recognize anything, and by what agency, he does not explain, nor is it clear from his expressed views. But those who assume pairs of opposites to exist in the first beginnings also construct the soul from opposites. Those who suppose the first beginning to be one of a pair of opposites such as hot and cold or the like, similarly also suppose the soul to be one of these. They have an etymological argument also ; those who say it is heat connect ζῆν (to live) with ζεῖν (to boil), but those who call it cold think that it is due to breathing and chilling or κατάψυξις (connecting this with ψυχή). These, then, are the traditional views about the soul and the causes to which it is attributed.

III. In the first place we must investigate the question of movement. For perhaps it is not merely untrue that the nature of the soul is of such a kind as those describe it to be who say that the soul moves itself or can do so, but it may be quite impossible that movement should be characteristic of the soul at all. We have said before that it is not necessary that that which produces movement should itself move. But everything may be moved in two senses (directly and indirectly. We call movement indirect, when a thing moves because it is in something which moves ; for instance the passengers in a ship. For they do not move in the same sense as the ship moves ; for the ship moves directly, but they move only by being in

Does the
soul move?

408 a

εἶναι. δῆλον δ' ἐπὶ τῶν μορίων· οἰκεία μὲν γάρ
 ἐστι κίνησις ποδῶν βάδισις, αὕτη δὲ καὶ ἀνθρώπων·
 10 οὐχ ὑπάρχει δὲ τοῖς πλωτήρσι τότε), διχῶς δὲ
 λεγομένου τοῦ κινεῖσθαι, νῦν ἐπισκοποῦμεν περὶ
 τῆς ψυχῆς εἰ καθ' αὐτὴν κινεῖται καὶ μετέχει
 κινήσεως.

Τεσσάρων δὲ κινήσεων οὐσῶν, φορᾶς ἀλλοιώσεως
 φθίσεως αὐξήσεως, ἥ μίαν τούτων κινεῖται ἂν ἡ
 πλείους ἢ πάσας. εἰ δὲ κινεῖται μὴ κατὰ συμ-
 15 βεβηκός, φύσει ἂν ὑπάρχοι κίνησις αὐτῇ· εἰ δὲ
 τοῦτο, καὶ τόπος· πᾶσαι γὰρ αἱ λεχθεῖσαι κινήσεις
 ἐν τόπῳ. εἰ δ' ἐστὶν ἡ οὐσία τῆς ψυχῆς τὸ κινεῖν
 ἑαυτήν, οὐ κατὰ συμβεβηκός αὐτῇ τὸ κινεῖσθαι
 ὑπάρξει, ὥσπερ τῷ λευκῷ ἢ τῷ τριπλήχει· κινεῖται
 20 γὰρ καὶ ταῦτα, ἀλλὰ κατὰ συμβεβηκός· ᾧ γὰρ
 ὑπάρχουσιν, ἐκεῖνο κινεῖται, τὸ σῶμα. διὸ καὶ οὐκ
 ἔστι τόπος αὐτῶν· τῆς δὲ ψυχῆς ἔσται, εἴπερ φύσει
 κινήσεως μετέχει.

"Ἐτι δ' εἰ φύσει κινεῖται, καὶ βία κινηθείη· καὶ
 εἰ βία, καὶ φύσει. τὸν αὐτὸν δὲ τρόπον ἔχει καὶ
 περὶ ἡρεμίας· εἰς ὃ γὰρ κινεῖται φύσει, καὶ ἡρεμεῖ
 25 ἐν τούτῳ φύσει· ὁμοίως δὲ καὶ εἰς ὃ κινεῖται βία,
 καὶ ἡρεμεῖ ἐν τούτῳ βία. ποῖαι δὲ βίαιοι τῆς
 ψυχῆς κινήσεις ἔσονται καὶ ἡρεμῖαι, οὐδὲ πλάττειν
 32

ON THE SOUL, I. III.

something which moves. And this becomes obvious if we consider the parts of the body. For the movement proper to the feet is walking, that is the movement natural to human beings ; and at the moment the passengers are not exhibiting this kind of motion). Movement then having two different senses, we are at present inquiring whether the soul moves and has a share in direct movement.

Now there are four kinds of movement : (1) Four kinds of movement. change of position, (2) change of state, (3) decay and (4) growth ; if then the soul moves, it has one of these kinds of movement, or more than one of them, or all of them. But if the movement of the soul is not accidental, then movement must belong to it by nature ; if this is so, its movement is in space, for all the kinds of movement mentioned are in space. But if it is the essence of the soul to move itself, then movement will not belong to it by accident, as it does for instance to the quality of whiteness, or to a length of three cubits ; these are liable to be moved, but only accidentally, and merely because the body to which they belong is moved. For this reason they have no position in space. But the soul must have a position in space, if it shares in movement by its own nature.

Again, if it moves by its own nature, it must be moved by some force ; and conversely if by force, then its movement is natural to it. And the same thing is true about its rest ; for it comes to rest by nature at the point to which it is moved by nature ; and similarly it rests by force in the place to which it is moved by force. But how these enforced movements of the soul and enforced rests occur is not easy to explain, even if we are prepared to allow our

Difficulties of attributing movement to the soul.

408 a βουλομένοις ῥάδιον ἀποδοῦναι. ἔτι δ' εἰ μὲν ἄνω
κινήσεται, πῦρ ἔσται, εἰ δὲ κάτω, γῆ· τούτων γάρ
τῶν σωμάτων αἱ κινήσεις αὗται. ὁ δ' αὐτὸς λόγος
31) καὶ περὶ τῶν μεταξύ.

"Ἐτι δ' ἐπεὶ φαίνεται κινουσα τὸ σῶμα, ταύτας
εὐλογον κινεῖν τὰς κινήσεις ὥς καὶ αὐτὴ κινεῖται.
εἰ δὲ τοῦτο, καὶ ἀντιστρέψασιν εἰπεῖν ἀληθὲς ὅτι
408 b ἦν τὸ σῶμα κινεῖται, ταύτην καὶ αὐτή. τὸ δὲ
σῶμα κινεῖται φορᾶ· ὥστε καὶ ἡ ψυχὴ μεταβάλλοι·
ἂν κατὰ τὸ σῶμα ἢ ὅλη ἢ κατὰ μέρη μεθισταμένη.
εἰ δὲ τοῦτ' ἐνδέχεται, καὶ ἐξελθοῦσαν εἰσιέναι
πάλιν ἐνδέχοιτ' ἄν· τούτῳ δ' ἔποιτ' ἂν τὸ ἀν-
5 ῖστασθαι τὰ τεθνεῶτα τῶν ζώων.

Τὴν δὲ κατὰ συμβεβηκὸς κίνησιν καὶ ὑφ' ἑτέρου
κινεῖτο· ὥσθειν γὰρ ἂν βίᾳ τὸ ζῶον. οὐ δεῖ δὲ ᾧ
τὸ ὑφ' ἑαυτοῦ κινεῖσθαι ἐν τῇ οὐσίᾳ, τοῦθ' ὑπ'
ἄλλου κινεῖσθαι, πλὴν εἰ μὴ κατὰ συμβεβηκός,
ὥσπερ οὐδὲ τὸ καθ' αὐτὸ ἀγαθὸν ἢ δι' αὐτό, τὸ
10 μὲν δι' ἄλλο εἶναι, τὸ δ' ἑτέρου ἕνεκεν. τὴν δὲ
ψυχὴν μάλιστα φαίη τις ἂν ὑπὸ τῶν αἰσθητῶν
κινεῖσθαι, εἴπερ κινεῖται.

Ἀλλὰ μὴν καὶ εἰ κινεῖ γὰρ αὐτὴ αὐτήν, καὶ αὐτὴ
κινεῖτ' ἄν, ὥστ' εἰ πᾶσα κίνησις ἑκστασίς ἐστι
τοῦ κινουμένου ἢ κινεῖται, καὶ ἡ ψυχὴ ἐξίσταιτ'
ἂν ἐκ τῆς οὐσίας, εἰ μὴ κατὰ συμβεβηκὸς αὐτήν

^a Many of the things we want we want for the sake of something else; e.g. we may want money for the sake of health, health for the sake of our work in the world, and so on. But ultimately we must reach a "good" which we want

ON THE SOUL, I. III.

fancies free play. If the soul moves upwards it will be fire, and if downwards earth ; for these two movements belong respectively to these two bodies ; and the same argument will apply to movements intermediate between " up " and " down."

Moreover, since the soul seems to move the body, it is reasonable to suppose that it imparts to it the same movements that it has itself ; and if this is so, we are entitled to declare the converse proposition true—namely, that the soul has the same movements as the body. But the body moves by change of position ; so that the soul must change position in the same way as the body, either as a complete whole or in parts. But, if this is possible, it would also be possible for the soul to go out of the body and enter in again ; and upon this would follow the possibility of resurrection for those living beings which are dead.

But if the soul's movement is accidental, it must be moved by something else ; the living creature might be pushed by force. But that which has the capacity for self-caused movement cannot be moved by anything else except accidentally : in the same way that which is good in itself is not good for anything else, and that which is good for its own sake is not good for the sake of anything else." But one would be inclined to assert that the soul, if it is moved at all, is moved by sensible objects.

Moreover, even if the soul moves itself, it still moves, so that, if every kind of movement is a displacement of that which moves in so far as it moves, then the soul is moved out of its essential nature, if

for its own sake, one, that is, which is not a subordinate end but the *summum bonum*, for which the Greek philosophers were always seeking.

406 b

15 κινεῖ. ἀλλ' ἔστιν ἡ κίνησις τῆς οὐσίας αὐτῆς καθ' αὐτήν.

"Εἰκοι δὲ καὶ κινεῖν φασὶ τὴν ψυχὴν τὸ σῶμα ἐν ᾧ ἐστίν, ὡς αὐτὴ κινεῖται, οἷον Δημόκριτος, παραπλησίως λέγων Φιλίππῳ τῷ κωμωδοδιδασκάλῳ. φησὶ γὰρ τὸν Δαίδαλον κινουμένην ποιῆσαι τὴν ξυλίνην Ἀφροδίτην, ἐγχείαντ' ἄργυρον χυτοί.
20 ὁμοίως δὲ καὶ Δημόκριτος λέγει· κινουμένης γὰρ φησι τὰς ἀδιαιρέτους σφαίρας διὰ τὸ πεφυκέναι μηδέποτε μένειν, συνεφέλκειν καὶ κινεῖν τὸ σῶμα πᾶν. ἡμεῖς δ' ἐρωτήσομεν εἰ καὶ ἡρέμησιν ποιεῖ ταῦτα ταῦτα. πῶς δὲ ποιήσει, χαλεπὸν ἢ καὶ ἀδύνατον εἰπεῖν. ὅλως δ' οὐχ οὕτω φαίνεται
25 κινεῖν ἡ ψυχὴ τὸ ζῶον, ἀλλὰ διὰ προαιρέσεώς τινος καὶ νοήσεως.

Τὸν αὐτὸν δὲ τρόπον καὶ ὁ Τίμαιος φυσιολογεῖ τὴν ψυχὴν κινεῖν τὸ σῶμα· τῷ γὰρ κινεῖσθαι αὐτὴν καὶ τὸ σῶμα κινεῖν διὰ τὸ συμπεπλέχθαι πρὸς αὐτό. συνεστηκυῖαν γὰρ ἐκ τῶν στοιχείων, καὶ μεμερισμένην κατὰ τοὺς ἁρμονικοὺς ἀριθμούς,
30 ὅπως αἰσθησὶν τε σύμφυτοι ἁρμονίας ἔχη καὶ τὸ πᾶν φέρηται συμφώνους φοράς, τὴν εὐθυαυρίαν εἰς κύκλον κατέκαμψεν· καὶ διελὼν ἐκ τοῦ εἰὸς δύο
407 a κύκλους δισσαχῇ συνημμένους πάλιν τὸν εἷα διεῖλεν εἰς ἑπτὰ κύκλους, ὡς οὕσας τὰς τοῦ οὐρανοῦ φοράς τὰς τῆς ψυχῆς κινήσεις.

Πρῶτον μὲν οὖν οὐ καλῶς τὸ λέγειν τὴν ψυχὴν μέγεθος εἶναι· τὴν γὰρ τοῦ παντὸς δῆλον ὅτι τοιαύτην εἶναι βούλεται οἷον ποτ' ἐστὶν ὁ καλού-

^a The point of the comparison is that both offer a purely external and mechanical explanation of movement.

ON THE SOUL, I. III.

it does not move itself accidentally, but movement is part of its essential nature.

Some say that the soul moves the body in which it resides, just as it moves itself. Such is the view of Democritus, arguing in the vein of Philip, the master of comedy ; for he tells us that Daedalus made the wooden Aphrodite move by pouring in quicksilver.^a Democritus speaks in a similar strain ; for he says that the indivisible spheres (atoms), because it is their nature never to remain still, draw the whole body with them and move it. But we want to ask whether these same atoms also produce rest. How they can do so, it is difficult, if not impossible, to say. In general the living creature does not seem to be moved by the soul in this way, but by exerting preference and by thought.

In the same way Timæus^b in Plato's dialogue also argues by physical science that the soul moves the body ; he thinks that the soul moves the body by its own movement, owing to its being intimately interwoven with it. For first the Creator fashioned the soul out of all the elements, and divided it according to harmonic ratios, in order that it might have perception of harmony and might move entirely by harmonic movements ; then he bent the straight line into the form of a circle, and, having divided the one circle into two, meeting at two points, he again divided one of these into seven, so that the movements of the heavenly bodies are the movements of the soul.

Plato's view that the soul causes movement of the body.

(1) Now in the first place, to say that the soul is a magnitude is unsound ; for " the soul of the world " must clearly be some such thing as what is called

Objections to Plato's view.

^b Plato, *Timæus*, pp. 33 *sqq.*

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5 *μενος νοῦς· οὐ γὰρ δὴ οἶόν γ' ἡ αἰσθητική, οὐδ' οἶον ἡ ἐπιθυμητική· τούτων γὰρ ἡ κίνησις οὐ κυκλοφορία. ὁ δὲ νοῦς εἰς καὶ συνεχής, ὥσπερ καὶ ἡ νόησις· ἡ δὲ νόησις τὰ νοήματα· ταῦτα δὲ τῷ ἐφεξῆς ἔν, ὡς ἀριθμός, ἀλλ' οὐχ ὡς τὸ μέγεθος. διόπερ οὐδ' ὁ νοῦς οὕτω συνεχής, ἀλλ' ἦτοι ἀμερὴς*
 10 *ἢ οὐχ ὡς μέγεθός τι συνεχής· πῶς γὰρ δὴ καὶ νοήσει μέγεθος ὣν ὁττωοῦν τῶν μορίων τῶν αὐτοῦ; μορίων δ' ἦτοι κατὰ μέγεθος ἢ κατὰ στιγμήν, εἰ δεῖ καὶ τοῦτο μόριον εἰπεῖν. εἰ μὲν οὖν κατὰ στιγμήν, αὗται δ' ἄπειροι, δῆλον ὡς οὐδέποτε διέξισιν, εἰ δὲ κατὰ μέγεθος, πολλάκις ἢ ἀπειράκις*
 15 *νοήσει τὸ αὐτό. φαίνεται δὲ καὶ ἅπαξ ἐνδεχόμενον. εἰ δ' ἱκανὸν θιγεῖν ὁττωοῦν τῶν μορίων, τί δεῖ κύκλῳ κινεῖσθαι ἢ καὶ ὅλως μέγεθος ἔχειν; εἰ δ' ἀναγκαῖον νοῆσαι τῷ ὅλῳ κύκλῳ θιγόντα, τίς ἐστιν ἡ τοῖς μορίοις θίξις; ἔτι δὲ πῶς νοήσει τὸ μεριστὸν ἀμερεῖ καὶ τὸ ἀμερὲς μεριστῷ; ἀναγκαῖον δὲ τὸν*
 20 *νοῦν εἶναι τὸν κύκλον τοῦτον. νοῦ μὲν γὰρ κίνησις νόησις, κύκλου δὲ περιφορά. εἰ οὖν ἡ νόησις περιφορά, καὶ νοῦς ἂν εἴη ὁ κύκλος, οὐ ἡ τοιαύτη περιφορά νόησις. ἀεὶ δὲ δὴ τι νοήσει· δεῖ γάρ, εἴπερ αἰδίδιος ἡ περιφορά· τῶν μὲν γὰρ πρακτικῶν νοήσεων*
 25 *ἔστι πέρατα (πᾶσαι γὰρ ἑτέρου χάριν), αἱ δὲ θεωρητικαὶ τοῖς λόγοις ὁμοίως ὀρίζονται. λόγος δὲ πᾶς*

ON THE SOUL, I. III.

mind ; it is nothing like either the perceptive or appetitive faculty ; for their movements are not circular. But the mind is one, and continuous like the process of thinking ; and the process of thinking implies thoughts. But these are continuous in the same sense as numbers and not as magnitudes. So also the mind is not continuous in this sense, but it is either indivisible, or at any rate is not continuous as a magnitude. For, if it is a magnitude, how will it think with any one of its parts ? With a part then considered as a magnitude, or as a point, if one can call a point a part. If then with a point, seeing that these are infinite, the mind can obviously never reach any end. If as a magnitude, it will think the same thoughts very many or an infinite number of times. But it is clear that it is capable of thinking a thought once only. (2) But if it is sufficient for it to touch with any one of the parts, why should it move in a circle, or generally have magnitude ? But if it can only think when in contact with the whole circle, what is its contact with the parts ? (3) Again, how will the divisible part think the indivisible thought, or the indivisible the divisible ? The mind must therefore be identical with this circle ; for the movement of the mind is the act of thinking, and the movement of a circle is circular. If then the act of thinking travels in a circle, then that circle would be the mind, of which the act of thinking is the circumference. Then there is some one thing which it will always think. It must behave in this way, for the circumference of a circle has no end. But all practical thinking has an end (for all thoughts have an object in view), and theoretical speculations are defined by their terms ; every term is a definition or

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ὀρισμὸς ἢ ἀποδείξις. αἱ δ' ἀποδείξεις καὶ ἀπ' ἀρχῆς, καὶ ἔχουσιν πῶς τέλος τὸν συλλογισμὸν ἢ τὸ συμπέρασμα· εἰ δὲ μὴ περατοῦνται, ἀλλ' οὐκ ἀνακάμπτουσί γε πάλιν ἐπ' ἀρχήν, προσλαμβάνουσαι δ' αἰεὶ μέσον καὶ ἄκρον εὐθυποροῦσιν· ἢ

30 δὲ περιφορὰ πάλιν ἐπ' ἀρχήν ἀνακάμπτει. οἱ δ' ὀρισμοὶ πάντες πεπερασμένοι. ἔτι εἰ ἡ αὐτὴ περιφορὰ πολλάκις, δεήσει πολλάκις νοεῖν τὸ αὐτό. ἔτι δ' ἡ νόησις ἔοικεν ἡρεμήσει τινὲ καὶ ἐπιστάσει, μᾶλλον ἢ κινήσει· τὸν αὐτὸν δὲ τρόπον καὶ ὁ συλλογισμός. ἀλλὰ μὴν οὐδὲ μακάριόν γε τὸ μὴ

407 b ῥάδιον ἀλλὰ βίαιον· εἰ δ' ἐστὶν ἡ κίνησις αὐτῆς μὴ οὐσία, παρὰ φύσιν ἂν κινοῖτο. ἐπίπονον δὲ καὶ τὸ μεμῖχθαι τῷ σώματι μὴ δυνάμενον ἀπολυθῆναι, καὶ προσέτι φευκτόν, εἴπερ βέλτιον τῷ ἰῶ μὴ μετὰ
5 σώματος εἶναι, καθάπερ εἴωθέ τε λέγεσθαι καὶ πολλοῖς συνδοκεῖ. ἄδηλος δὲ καὶ τοῦ κύκλω φέρεσθαι τὸν οὐρανὸν ἢ αἰτία· οὔτε γὰρ τῆς ψυχῆς ἢ οὐσία αἰτία τοῦ κύκλω φέρεσθαι, ἀλλὰ κατὰ συμβεβηκὸς οὕτω κινεῖται, οὔτε τὸ σῶμα αἴτιον, ἀλλ' ἡ ψυχὴ μᾶλλον ἐκείνῳ. ἀλλὰ μὴν οὐδ' ὅτι
10 βέλτιον λέγεται· καίτοι γ' ἐχρῆν διὰ τοῦτο τὸν θεὸν κύκλω ποιεῖν φέρεσθαι τὴν ψυχὴν, ὅτι βέλτιον αὐτῇ τὸ κινεῖσθαι τοῦ μένειν, κινεῖσθαι δ' οὕτως ἢ ἄλλως. ἐπεὶ δ' ἐστὶν ἡ τοιαύτη σκέψις ἑτέρων λόγων οἰκειότερα, ταύτην μὲν ἀφῶμεν τὸ νῦν.

Ἐκεῖνο δὲ ἄτοπον συμβαίνει καὶ τούτῳ τῷ λόγῳ
15 καὶ τοῖς πλείστοις τῶν περὶ ψυχῆς· συνάπτουσι γὰρ καὶ τιθέασιν εἰς σῶμα τὴν ψυχὴν, οὐθὲν προσ-

ON THE SOUL, I. III.

a demonstration. A demonstration must start from some beginning, and has an end in a sense in an inference or conclusion. Even if they do not arrive at a conclusion, they do not at any rate return again to the beginning, but they advance in a straight line by means of the middle and extreme terms. But the circle is for ever returning to its starting-point, whereas all definitions are finite. Again, if the same circle recurs frequently, the mind will frequently think the same thing. (4) Again, the mind seems more like a state of rest or a halting than a movement; and the same thing is true of the syllogism. (5) Furthermore, that which moves not easily but only by force cannot be happy. If its movement is not an essential quality, it will be contrary to nature. (6) Again, the idea of the soul being involved with the body without the possibility of escape is painful, and must be avoided, if it is true that it is better for the mind to be without the body, as is usually said and as most men believe. (7) Again, the reason why the heavenly bodies move in a circle is obscure. For the essence of the soul suggests no reason for its circular movement, but it only moves in this way by accident, nor is the body responsible for the soul but rather the converse. Nor is there any suggestion that this circular movement is better, and yet God must surely have made the soul move in a circle for this very reason, that movement is a better condition for it than rest, and this movement better than any other. But since this inquiry belongs more properly to another subject let us leave it now.

But there is one absurd feature both in this argument, and in most of those about the soul. Men associate the soul with and place it in the body, with-

Relation of
soul and
body.

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διορίσαντες διὰ τίν' αἰτίαν καὶ πῶς ἔχοντος τοῦ σώματος. καίτοι δόξειεν ἂν τοῦτ' ἀναγκαῖον εἶναι· διὰ γὰρ τὴν κοινωνίαν τὸ μὲν ποιεῖ τὸ δὲ πάσχει καὶ τὸ μὲν κινεῖται τὸ δὲ κινεῖ, τούτων δ' οὐθὲν
 20 ὑπάρχει πρὸς ἀλλήλα τοῖς τυχοῦσιν. οἱ δὲ μόνον ἐπιχειροῦσι λέγειν ποῖόν τι ἡ ψυχὴ, περὶ δὲ τοῦ δεξιόμενου σώματος οὐθὲν ἔτι προσδιορίζουσιν, ὥσπερ ἐνδεχόμενον κατὰ τοὺς Πυθαγορικοὺς μύθους τὴν τυχοῦσαν ψυχὴν εἰς τὸ τυχὸν ἐνδύεσθαι σῶμα· δοκεῖ γὰρ ἕκαστον ἴδιον ἔχειν εἶδος καὶ μορφήν. παραπλήσιον δὲ λέγουσιν ὥσπερ εἴ τις
 25 φαίη τὴν τεκτονικὴν εἰς αὐλοὺς ἐνδύεσθαι· δεῖ γὰρ τὴν μὲν τέχνην χρῆσθαι τοῖς ὀργάνοις, τὴν δὲ ψυχὴν τῷ σώματι.

IV. Καὶ ἄλλη δέ τις δόξα παραδέδοται περὶ ψυχῆς, πιθανὴ μὲν πολλοῖς οὐδεμιᾶς ἡττον τῶν λεγομένων, λόγους δ' ὥσπερ εὐθύνας δεδωκυῖα καὶ τοῖς ἐν
 30 κοινῷ γινομένοις λόγοις· ἁρμονίαν γάρ τινα αὐτὴν λέγουσι· καὶ γὰρ τὴν ἁρμονίαν κρᾶσιν καὶ σύνθεσιν ἐναντίων εἶναι, καὶ τὸ σῶμα συγκεῖσθαι ἐξ ἐναντίων.

Καίτοι γε ἡ μὲν ἁρμονία λόγος τίς ἐστι τῶν μιχθέντων ἢ σύνθεσις, τὴν δὲ ψυχὴν οὐδέτερον οἶόν τ' εἶναι τούτων. ἔτι δὲ τὸ κινεῖν οὐκ ἔστιν ἁρ-
 408 a μονίας, ψυχῇ δὲ πάντες ἀπονέμουσι τοῦτο μάλισθ' ὥς εἰπεῖν. ἁρμόζει δὲ μᾶλλον καθ' ὑγιείας λέγειν ἁρμονίαν, καὶ ὅλως τῶν σωματικῶν ἀρετῶν, ἢ κατὰ ψυχῆς. φανερώτατον δ' εἴ τις ἀποδιδόναί
 5 πειραθείη τὰ πάθη καὶ τὰ ἔργα τῆς ψυχῆς ἁρμονία τινί· χαλεπὸν γὰρ ἐφαρμόζειν. ἔτι δ' εἰ λέγομεν¹ τὴν ἁρμονίαν εἰς δύο ἀποβλέποντες, κυριώτατα μὲν

¹ λέγομεν B.

ON THE SOUL, I. III.—IV.

out laying down why this is so, and in what condition the body is ; and yet this would seem to be essential. For it is by this association that the soul acts and is acted upon, that it moves and causes movement, and none of these qualities belong to each other by chance. But they only undertake to explain what is the nature of the soul, without postulating anything about the body which is to receive it, as though it were possible, as the Pythagorean stories suggest, that any soul can find its way into any body : but each body seems to have its own peculiar shape and form. But they talk as if one could suppose that carpentry can find its way into flute-playing; each craft must employ its own tools, and each soul its own body.

IV. There is another traditional theory about the soul, which many find the most credible of all current theories, although it has, as it were, been called to account in general discussions. It is said that the soul is a harmony of some kind ; for, they argue, a harmony is a mixture or composition of opposites, and the body is composed of opposites.

Is the soul
a harmony
or propor-
tion ?

But (1) a harmony is either a proportion or a composition of the ingredients mixed, and the soul cannot be either of these things. (2) Again, movement is not a characteristic of harmony, and yet almost everyone ascribes this to the soul as an essential. (3) It seems more in accord with the facts to ascribe harmony to bodily health and to bodily qualities generally than to the soul. This will become quite obvious if one tries to ascribe the soul's experiences and actions to some sort of harmony ; for it is difficult to make a harmony of them. (4) Again, we use the word harmony in two different senses : primarily

Objections
to this
theory.

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τῶν μεγεθῶν ἐν τοῖς ἔχουσι κίνησιν καὶ θέσιν τὴν σύνθεσιν αὐτῶν, ἐπειδὰν οὕτω συναρμόζωσιν ὥστε μηδὲν συγγενὲς παραδέχεσθαι, ἐντεῦθεν δὲ καὶ τὸν τῶν μεμιγμένῳ λόγον.

- 10 Οὐδετέρως μὲν οὖν εὐλογοί, ἡ δὲ σύνθεσις τῶν τοῦ σώματος μερῶν λίκαν εὐεξέταστος· πολλαὶ τε γὰρ αἱ συνθέσεις τῶν μερῶν καὶ πολλαχῶς· τίνος οὖν ἢ πῶς ὑπολαβεῖν τὸν νοῦν χρή σύνθεσιν εἶναι, ἢ καὶ τὸ αἰσθητικὸν ἢ ὀρεκτικόν; ὁμοίως δὲ ἄτοπον καὶ τὸν λόγον τῆς μίξεως εἶναι τὴν ψυχὴν.
- 15 οὐ γὰρ τὸν αὐτὸν ἔχει λόγον ἢ μίξις τῶν στοιχείων καθ' ἣν σὰρξ καὶ καθ' ἣν ὄστούν. συμβήσεται οὖν πολλὰς τε ψυχὰς ἔχειν καὶ κατὰ πᾶν τὸ σῶμα, εἴπερ πάντα μὲν ἐκ τῶν στοιχείων μεμιγμένῳ, ὃ δὲ τῆς μίξεως λόγος ἀρμονία καὶ ψυχὴ. ἀπαιτήσκει δ' ἂν τις τοῦτό γε καὶ παρ' Ἐμπεδοκλέους.
- 20 ἕκαστον γὰρ αὐτῶν λόγῳ τινὶ φησιν εἶναι· πότερον οὖν ὁ λόγος ἐστὶν ἡ ψυχὴ, ἢ μᾶλλον ἕτερόν τι οὐσα ἐγγίνεται τοῖς μέλεσιν; ἔτι δὲ πότερον ἡ φιλία τῆς τυχούσης αἰτία μίξεως ἢ τῆς κατὰ τὸν λόγον; καὶ αὕτη πότερον ὁ λόγος ἐστὶν ἢ παρὰ τὸν λόγον ἕτερόν τι; ταῦτα μὲν οὖν ἔχει τοιαύτας
- 25 ἀπορίας· εἰ δ' ἐστὶν ἕτερον ἢ ψυχὴ τῆς μίξεως, τί δή ποτε ἅμα τῷ σαρκὶ εἶναι ἀναιρεῖται καὶ τῷ τοῖς ἄλλοις μορίοις τοῦ ζώου; πρὸς δὲ τούτοις

^a Love is Empedocles' personification of the force of attraction which accounts for the combination of elements into a whole, as its opposite repulsion (Strife) accounts for the separation of things into separate wholes.

ON THE SOUL, I. iv.

of magnitude, to mean putting together in the case of those things, which have movement and position, when they fit in such a way that there is no room for anything of the same kind between them ; but in another sense we use the word harmony to mean the proportion in which the components are mixed.

Neither of these meanings offers a reasonable explanation of the soul, but, in the sense of composition of parts of the body, the theory is easily refuted. For the compositions of parts are many, and take place in many ways. Of which of the parts, then, are we to suppose that the mind or the perceptive or appetitive faculty is a composition, and how is such a composition effected ? But the view that the soul is a harmony in the sense of a proportion of components is equally absurd. For the mixing of the elements which go to make the flesh has not the same proportions as that which makes the bone. It will follow, then, that there are many souls distributed all over the body, if all is made up of elements in different combinations, and the proportion of the mixture is a harmony which is the soul. One would like to question Empedocles ; for he says that each of these parts is determined by a certain proportion. Now is this proportion the soul, or is the soul something distinct, which develops in the limbs ? Again, is his principle of Love " responsible for a chance mixture, or for a mixture in a fixed proportion ? And is the soul this proportion, or is it some other thing distinct from the proportion ? Such are the difficulties which these theories present. If the soul is a different thing from the mixture in proportion, why does it die at the same time as the flesh and the other parts of the living animal ? Besides this, unless each of the

408 a εἴπερ μὴ ἕκαστον τῶν μορίων ψυχὴν ἔχει, εἰ μὴ
 ἐστὶν ἡ ψυχὴ ὁ λόγος τῆς μίξεως, τί ἐστὶν ὃ
 φθείρεται τῆς ψυχῆς ἀπολειπούσης;

“Οτι μὲν οὖν οὐθ’ ἁρμονίαν οἶόν τ’ εἶναι τὴν
 311 ψυχὴν οὔτε κύκλῳ περιφέρεισθαι, δῆλον· ἐκ τῶν
 εἰρημένων. κατὰ συμβεβηκὸς δὲ κινεῖσθαι, καθ-
 ἅπερ εἵπομεν, ἔστι καὶ κινεῖν ἑαυτήν, οἷον κινεῖσθαι
 μὲν ἐν ᾧ ἐστί, τοῦτο δὲ κινεῖσθαι ὑπὸ τῆς ψυχῆς·
 ἄλλως δ’ οὐχ οἶόν τε κινεῖσθαι κατὰ τόπον αὐτήν.

Εὐλογώτερον δ’ ἀπορήσειεν ἂν τις περὶ αὐτῆς ὡς
 408 b κινουμένης, εἰς τὰ τοιαῦτα ἀποβλέψας: φαμέν γάρ
 τὴν ψυχὴν λυπεῖσθαι χαίρειν θαρρεῖν φοβεῖσθαι,
 ἔτι δὲ ὀργίζεσθαι τε καὶ αἰσθάνεσθαι καὶ διανοεῖ-
 σθαι· ταῦτα δὲ πάντα κινήσεις εἶναι δοκοῦσιν.

5 ὅθεν οἰηθεῖη τις ἂν αὐτὴν κινεῖσθαι· τὸ δ’ οὐκ ἔστιν
 ἀναγκαῖον· εἰ γὰρ καὶ ὅτι μάλιστα τὸ λυπεῖσθαι ἢ
 χαίρειν ἢ διανοεῖσθαι κινήσεις εἰσὶ, καὶ ἕκαστον
 κινεῖσθαι τούτων, τὸ δὲ κινεῖσθαι ἐστὶν ὑπὸ τῆς
 ψυχῆς, οἷον τὸ ὀργίζεσθαι ἢ φοβεῖσθαι τῷ τὴν
 καρδίαν ὡδὶ κινεῖσθαι, τὸ δὲ διανοεῖσθαι ἢ τοιοῦτον

10 ἴσως ἢ ἕτερόν τι (τούτων δὲ συμβαίνει τὰ μὲν
 κατὰ φορὰν τινῶν κινουμένων, τὰ δὲ κατ’ ἄλ-
 λοίωσιν. ποῖα δὲ καὶ πῶς, ἕτερός ἐστι λόγος).
 τὸ δὲ λέγειν ὀργίζεσθαι τὴν ψυχὴν ὁμοιον καὶ εἴ-
 τις λέγοι τὴν ψυχὴν ὑφαίνειν ἢ οἰκοδομεῖν· βέλτιον
 γὰρ ἴσως μὴ λέγειν τὴν ψυχὴν ἐλεεῖν ἢ μανθάνειν ἢ
 15 διανδεῖσθαι, ἀλλὰ τὸν ἄνθρωπον τῇ ψυχῇ. τοῦτο
 δὲ μὴ ὡς ἐν ἐκείνῃ τῆς κινήσεως οὔσης, ἀλλ’ ὅτε
 μὲν μέχρι ἐκείνης, ὅτε δ’ ἀπ’ ἐκείνης, οἷον ἡ μὲν

ON THE SOUL, I. iv.

parts has a separate soul of its own, and if in consequence the soul is not the proportion of the mixture, what is it which is destroyed when the soul leaves it?

It is clear from what has been said that the soul cannot be a harmony, nor can it move in a circle. It is, however, possible, as we have said, that it has movement as an accidental quality, and that it can move itself in the sense of moving within that in which it resides, and that this is moved by the soul; but in no other sense can it move in space.

Summary.

The following considerations suggest even more reasonable difficulties in the theory that the soul moves. We say that the soul grieves, is courageous, or afraid, and also grows angry, perceives and thinks; all these seem to be movements; from which one might suppose that the soul is moved; but this is not a necessary consequence. Let us grant that grief, joy and thinking are all movements, and that each of these may be called a movement; let us further admit that movement is caused by the soul—for instance that anger and fear are particular movements of the heart, and that thinking is the movement of the heart or of something else (recognizing of course that some of these movements are in position, and some qualitative: of what kind and in what way is another question). Even if we admit both these propositions, to say that the soul gets angry is as if one were to say that the soul weaves or builds a house. Probably it is wiser not to say that the soul pities, or learns, or thinks, but to say rather that the soul is the instrument whereby man does these things; that is to say, that the movement does not take place in the soul, but sometimes penetrates to it, and sometimes starts from it. For instance perception starts from

Further difficulties about the soul's movement.

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αἰσθησις ἀπὸ τωνδί, ἢ δ' ἀνάμνησις ἀπ' ἐκείνης
ἐπὶ τὰς ἐν τοῖς αἰσθητηρίοις κινήσεις ἢ μονάς.

Ὁ δὲ νοῦς ἔοικεν ἐγγίνεσθαι οὐσίᾳ τις οὐσα,
20 καὶ οὐ φθείρεσθαι. μάλιστα γὰρ ἐφθείρετ' ἂν ὑπὸ
τῆς ἐν τῷ γήρα ἀμαυρώσεως, ἵν' ὃς ἴσως ὅπερ
ἐπὶ τῶν αἰσθητηρίων συμβαίνει· εἰ γὰρ λάβοι ὁ
πρεσβύτης ὅμια τοιονδί, βλέποι ἂν ὥσπερ καὶ ὁ
νέος. ὥστε τὸ γήρας οὐ τῷ τὴν ψυχὴν τι πεπον-
θέναι, ἀλλ' ἐν ᾧ, καθάπερ ἐν μέλαις καὶ νόσοις.
25 καὶ τὸ νοεῖν δὴ καὶ τὸ θεωρεῖν μαραίνεται ἄλλου
τινὸς ἔσω φθειρομένου, αὐτὸ δὲ ἀπαθές ἐστιν. τὸ
δὲ διανοεῖσθαι καὶ φιλεῖν ἢ μισεῖν οὐκ ἔστιν ἐκείνου
πάθη, ἀλλὰ τουδὶ τοῦ ἔχοντος ἐκεῖνο, ἢ ἐκεῖνο
ἔχει. διὸ καὶ τούτου φθειρομένου οὔτε μνημονεύει
οὔτε φιλεῖ· οὐ γὰρ ἐκείνου ἦν, ἀλλὰ τοῦ κοινού, ὃ
ἀπόλωλεν· ὃ δὲ νοῦς ἴσως θεϊότερόν τι καὶ ἀπαθές
30 ἐστιν. ὅτι μὲν οὖν οὐχ οἶόν τε κινεῖσθαι τὴν
ψυχὴν, φανερόν ἐκ τούτων· εἰ δ' ὅλως μὴ κινεῖται,
δῆλον ὥς οὐδ' ὑφ' ἑαυτῆς.

Πολὺ δὲ τῶν εἰρημένων ἀλογώτατον τὸ λέγειν
ἀριθμὸν εἶναι τὴν ψυχὴν κινεῖσθαι ἑαυτόν· ὑπάρχει
γὰρ αὐτοῖς ἀδύνατα· πρῶτα μὲν τὰ ἐκ τοῦ κινεῖσθαι
409 a συμβαίνοντα, ἰδίᾳ δ' ἐκ τοῦ λέγειν αὐτὴν ἀριθμόν·
πῶς γὰρ χρὴ νοῆσαι μονάδα κινουμένην, καὶ ὑπὸ
τίνος, καὶ πῶς, ἀμερῇ καὶ ἀδιάφορον οὖσαν; εἰ
γὰρ ἐστὶ κινητικὴ καὶ κινητὴ, διαφέρειν δεῖ. ἔτι

^a This is the theory of Xenocrates, a contemporary of Aristotle, who succeeded Speusippus as head of the "Academy."

ON THE SOUL, I. iv.

particular objects and reaches the soul ; recollection starts from the soul and reaches to movements in the sense organs, or to remains of such movements.

But the mind seems to have an independent existence and not to suffer decay. If it could be destroyed the most probable cause would be the feebleness of old age, but, as it cannot, probably the same thing occurs as in the sense organs ; for if an old man could acquire the eye of a young man, he would see as a young man sees. So that old age is not due to any affection of the soul, but only of that in which the soul resides, as is the case in drunkenness and disease. Thus the power of thought and speculation decays because something else within decays, but the power of thought is not itself affected. Thinking, loving and hating are not then qualities of the mind, but rather of the individual man who possesses the mind, in so far as he does so. Memory and love then fail because he fails ; for they were never part of the mind, but of the whole entity which has perished. Possibly the mind is too divine, and is therefore unaffected. It is then obvious from these considerations that the soul cannot move ; and, if it is generally incapable of movement, it is obviously not moved by itself.

Does the
soul decay ?

But of all the unreasonable theories about the soul the most unreasonable is that which calls the soul a number which moves itself.^a In this theory there are inherent impossibilities, first those which arise from the idea of movement and in particular from calling the soul a number. For how can one conceive (1) a unit moving, and by what is it moved, and in what way, being as it is without parts and indivisible ? For if it is movable and moved it must have divisions.

The soul as a
self-moving
number.

δ' ἐπεὶ φασὶ κινηθεῖσαν γραμμὴν ἐπίπεδον ποιεῖν,
 5 στιγμὴν δὲ γραμμὴν, καὶ αἱ τῶν μονάδων κινήσεις
 γραμμαὶ ἔσονται· ἡ γὰρ στιγμὴ μονάς ἐστι θέσιν
 ἔχουσα· ὁ δ' ἀριθμὸς τῆς ψυχῆς ἤδη πού ἐστι καὶ
 θέσιν ἔχει. ἔτι δ' ἀριθμοῦ μὲν εἶναι ἀφέλη τις
 ἀριθμὸν ἢ μονάδα, λείπεται ἄλλος ἀριθμὸς· τὰ δὲ
 φυτὰ καὶ τῶν ζώων πολλὰ διαιρούμενα ζῇ, καὶ
 10 δοκεῖ τὴν αὐτὴν ψυχὴν ἔχειν τῷ εἶδει. δόξειε δ'
 ἂν οὐθὲν διαφέρειν μονάδας λέγειν ἢ σωμάτια
 μικρά· καὶ γὰρ ἐκ τῶν Δημοκρίτου σφαιρίων εἶναι
 γένωνται στιγμαί, μόνον δὲ μένη τὸ ποσόν, ἔσται
 τι ἐν αὐτῷ τὸ μὲν κινεῖν τὸ δὲ κινούμενον, ὥσπερ
 ἐν τῷ συνεχεῖ· οὐ γὰρ διὰ τὸ μεγέθει διαφέρειν ἢ
 15 μικρότητι συμβαίνει τὸ λεχθέν, ἀλλ' ὅτι ποσόν.
 διὸ ἀναγκαῖον εἶναι τι τὸ κινήσον τὰς μονάδας.
 εἰ δ' ἐν τῷ ζῳῷ τὸ κινεῖν ἢ ψυχὴ, καὶ ἐν τῷ
 ἀριθμῷ, ὥστε οὐ τὸ κινεῖν καὶ τὸ κινούμενον ἢ
 ψυχὴ, ἀλλὰ τὸ κινεῖν μόνον. ἐνδέχεται δὲ ἰδὴ
 πῶς μονάδα ταύτην εἶναι;¹ δεῖ γὰρ ὑπάρχειν τινὰ
 20 αὐτῇ διαφορὰν πρὸς τὰς ἄλλας· στιγμῆς δὲ μονα-
 δικῆς τίς ἂν εἴη διαφορὰ πλὴν θέσις; εἰ μὲν οὖν
 εἰσὶν ἕτεραι αἱ ἐν τῷ σώματι μονάδες καὶ αἱ
 στιγμαί, ἐν τῷ αὐτῷ ἔσονται αἱ μονάδες· καθέξει
 γὰρ χώραν στιγμῆς. καίτοι τί κωλύει ἐν τῷ
 αὐτῷ εἶναι, εἰ δύο, καὶ ἀπείρους; ὦν γὰρ ὁ τόπος
 25 ἀδιαίρετος, καὶ αὐτά. εἰ δ' αἱ ἐν τῷ σώματι
 στιγμαὶ ὁ ἀριθμὸς ὁ τῆς ψυχῆς, ἢ εἰ ὁ ἐκ τῶν ἐν
 τῷ σώματι στιγμῶν ἀριθμὸς ἢ ψυχὴ, διὰ τί οὐ

¹ B. δὴ πως and no question mark.

ON THE SOUL, I. iv.

(2) Again, since they say that a straight line in motion describes a plane figure, and a moving point a line, the movement of units will be straight lines. For a point is a unit having position ; but the number of the soul is already somewhere, and has position.

(3) Now, if one subtracts a number or unit from a number, another number is left. But plants and many animals continue to live even when divided, and seem to have the same soul in these fragments as in their original form. It would seem to make no difference whether we speak of units or of minute bodies. For if points are developed from Democritus's spheres, and if magnitude is their only permanent quality, there will be something which moves and something which is moved, as in a continuous succession. For what we have mentioned does not occur through any difference of size (either great or small), but because it is a quantity. There must, then, be something which will give movement to the units. But if that which produces movement in the animal is the soul, then it is also so in the number, so that the soul is not both that which produces movement and that which is moved, but only that which produces movement. But how can this possibly be a unit ? For it must have differences from other units. But what difference can there be between one point and another except in position ? If then the bodily units and points are different, the units will be in the same place, for each will occupy the place of a point. And yet what prevents them, if there are two or an infinite number, from coinciding in the same place ? For where space is indivisible so are they. But if the bodily points are identical with the soul number, or if the number of bodily points is the soul, why do not

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πάντα ψυχὴν ἔχουσι τὰ σώματα; στιγμαὶ γὰρ ἐν ἅπασιν δοκοῦσιν εἶναι καὶ ἄπειροι. ἔτι δὲ πῶς οἶόν τε χωρίζεσθαι τὰς στιγμάς¹ καὶ ἀπολύεσθαι τῶν
 30 σωμάτων, εἴ γε μὴ διαιροῦνται αἱ γραμμαὶ εἰς στιγμάς;

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V. Συμβαίνει δέ, καθάπερ εἵπομεν, τῇ μὲν ταυτὸ λέγειν τοῖς σώματι λεπτομερὲς αὐτῇ τιθεῖσι, τῇ
 δ', ὥσπερ Δημόκριτος κινεῖσθαι φησὶν ὑπὸ τῆς
 ψυχῆς, ἴδιον τὸ ἄτοπον· εἴπερ γὰρ ἔστιν ἡ ψυχὴ ἐν παντὶ τῷ αἰσθανομένῳ σώματι, ἀναγκαῖον ἐν τῷ αὐτῷ δύο εἶναι σώματα, εἰ σῶμά τι ἡ ψυχὴ· τοῖς δ' ἀριθμὸν λέγουσιν, ἐν τῇ μιᾷ στιγμῇ πολ-
 5 λὰς στιγμάς ἢ πᾶν σῶμα ψυχὴν ἔχειν, εἰ μὴ διαφέρων τις ἀριθμὸς ἐγγίνεται καὶ ἄλλος τις τῶν ὑπαρχουσῶν ἐν τῷ σώματι στιγμῶν. συμβαίνει τε κινεῖσθαι τὸ ζῶον ὑπὸ τοῦ ἀριθμοῦ, καθάπερ καὶ Δημόκριτον ἔφαμεν αὐτὸ κινεῖν· τί γὰρ διαφέρει σφαίρας λέγειν σμικρὰς ἢ μονάδας μεγά-
 10 λας, ἢ ὅλως μονάδας φερομένας; ἀμφοτέρως γὰρ ἀναγκαῖον κινεῖν τὸ ζῶον τῷ κινεῖσθαι ταύτας.

Τοῖς δὲ συμπλέξασιν εἰς τὸ αὐτὸ κίνησιν καὶ ἀριθμὸν ταυτὰ τε συμβαίνει καὶ πολλὰ ἕτερα τοιαῦτα· οὐ γὰρ μόνον ὁρισμὸν ψυχῆς ἀδύνατον τοιοῦτον εἶναι, ἀλλὰ καὶ συμβεβηκός. δῆλον δ'
 15 εἴ τις ἐπιχειρήσειεν ἐκ τοῦ λόγου τούτου τὰ πάθη καὶ τὰ ἔργα τῆς ψυχῆς ἀποδιδόναι, οἷον λογισμούς, αἰσθήσεις, ἡδονάς, λύπας, ὅσα ἄλλα τοιαῦτα· ὥσπερ γὰρ εἵπομεν πρότερον, οὐδὲ μαντεύσασθαι ῥάδιον ἐξ αὐτῶν.

¹ ψυχὰς B.

ON THE SOUL, I. iv.—v.

all bodies have a soul? For there appear to be an infinite number of points in all of them. And again how is it possible to separate the points and free them from the bodies, unless the lines are divided into points?

V. As we have said, this theory in one direction says the same thing as those who suppose the soul to be a body of light parts, and in another direction, just as when Democritus states that the body is moved by the soul, it has an absurdity of its own. For if the soul exists in every part of the sentient body then there must be two bodies in the same place, if the soul is a body. But those who say that the soul is a number must believe that there are many points in one point, or else that every body has a soul, unless the number existing in the soul is a different thing from the points which reside in bodies. And it follows that the living creature is moved by the number, just as we have already said that Democritus accounted for its movement; for what difference does it make whether we call them small spheres, or large units, or generally moving units? For in either case they can only move the living creature by moving themselves.

Democritus' theory further criticized.

These are the difficulties in the way of those who combine movement and number together, and there are many other problems of a like nature; for not only is this unable to serve as a definition of the soul; it is not even one of its accidental attributes. And this will become clear to anyone, if he tries to give an explanation based on this theory of the affections and functions of the soul, such as calculations, sensations, pleasures, sorrows, and so on; for, as we have said before, on these lines it is not easy even to conjecture an explanation.

Conclusion.

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Τριῶν δὲ τρόπων παραδεδομένων καθ' οὓς
 30 ὀρίζονται τὴν ψυχὴν, οἱ μὲν τὸ κινήτικώτατον
 ἀπεφάναντο τῷ κινεῖν ἑαυτό, οἱ δὲ σῶμα τὸ λε-
 πτομερέστατον ἢ τὸ ἀσωματώτατον τῶν ἄλλων.
 ταῦτα δὲ τίνας ἀπορίας τε καὶ ὑπεναντιώσεις ἔχει,
 διεληλύθαμεν σχεδόν. λείπεται δ' ἐπισκέψασθαι
 πῶς λέγεται τὸ ἐκ τῶν στοιχείων αὐτὴν εἶναι.
 25 λέγουσι μὲν γάρ, ἢν' αἰσθάνηται τε τῶν ὄντων
 καὶ ἕκαστον γνωρίζῃ, ἀναγκαῖον δὲ συμβαίνειν
 πολλὰ καὶ ἀδύνατα τῷ λόγῳ· τίθενται γὰρ γνωρίζειν
 τῷ ὁμοίῳ τὸ ὅμοιον, ὥσπερ ἂν εἰ τὴν ψυχὴν τὰ
 πράγματα τιθέντες. οὐκ ἔστι δὲ μόνα ταῦτα,
 πολλὰ δὲ καὶ ἕτερα, μᾶλλον δ' ἴσως ἄπειρα τὸν
 30 ἀριθμόν, τὰ ἐκ τούτων. ἐξ ὧν μὲν οὖν ἐστὶν
 ἕκαστον τούτων, ἔστω γινώσκειν τὴν ψυχὴν καὶ
 αἰσθάνεσθαι· ἀλλὰ τὸ σύνολον τίτι γνωριεῖ ἢ
 αἰσθήσεται, οἷον τί θεὸς ἢ ἄνθρωπος ἢ σὰρξ ἢ
 410 α ὄστουν; ὁμοίως δὲ καὶ ἄλλο ὅτιοῦν τῶν συνθέτων·
 οὐ γὰρ ὅπως οὖν ἔχοντα τὰ στοιχεῖα τούτων ἕκα-
 στον, ἀλλὰ λόγῳ τινὶ καὶ συνθέσει, καθάπερ φησὶ
 καὶ Ἑμπεδοκλῆς τὸ ὄστουν·

ἡ δὲ χθὼν ἐπίηρος ἐν εὐστέρνοις χοάνοισιν
 5 τῷ¹ δύο τῶν ὀκτῶ μερέων λάχε νήστιδος αἰγλῆς,
 τέσσαρα δ' Ἑφαίστοιο· τὰ δ' ὅστέα λεύκ'
 ἐγένοντο.

οὐδὲν οὖν ὄφελος εἶναι τὰ στοιχεῖα ἐν τῇ ψυχῇ, εἰ
 μὴ καὶ οἱ λόγοι ἐνέσονται καὶ ἡ σύνθεσις· γνωριεῖ
 γὰρ ἕκαστον τὸ ὅμοιον, τὸ δ' ὄστουν ἢ τὸν ἄνθρω-

¹ τὰ B.

ON THE SOUL, I. v.

Three methods of defining the soul have come down to us ; some have regarded it as the greatest cause of movement, because it moves itself ; others again have explained the soul as composed of very light parts, or as corporeal but less so than any other body. We have pretty well exhausted the difficulties and contradictions which these two definitions involve. But it remains to examine the third definition, and see what is meant by saying that the soul is composed of the elements. This theory is intended to explain how the soul apprehends and recognizes each existing thing, but the theory involves many impossibilities ; its supporters assume that like is recognized by like, and thus they identify the soul with the things it knows. But these elements are not the only things existing ; there are many other things compounded of the elements, in fact these are almost infinite. Granted that the soul might know and perceive the elements from which each of these things is compounded ; yet by what part will it perceive and know a composite whole such as god, man, flesh, or bone ? And similarly any other compound whole ? For such wholes do not consist of the elements arranged at random, but in a certain proportion and with some principle of composition, as Empedocles says in his description of bone :

“ The pleasant earth in full-breasted crucibles took
• two of the eight parts from the gleam of moisture,
and four from Hephaestus ; and bones came into
being all white.”

It is then no use for the elements to exist in the soul, unless the proportion and principle of composition also exist in it ; for each thing will recognize the like, but there will be nothing in the soul to recognize

The soul as
a compound
of the
elements.

410 a

10 πον οὐθέν, εἰ μὴ καὶ ταῦτ' ἐνέσται. τοῦτο δ' ὅτι ἀδύνατον, οὐθέν δεῖ λέγειν· τίς γὰρ ἂν ἀπορήσειεν εἰ ἐνεστὶν ἐν τῇ ψυχῇ λίθος ἢ ἄνθρωπος; ὁμοίως δὲ καὶ τὸ ἀγαθὸν καὶ τὸ μὴ ἀγαθόν. τὸν αὐτὸν δὲ τρόπον καὶ περὶ τῶν ἄλλων.

Ἔτι δὲ πολλαχῶς λεγομένου τοῦ ὄντος (σημαίνει γὰρ τὸ μὲν τόδε τι, τὸ δὲ ποσὸν ἢ ποιὸν ἢ καὶ
 15 τινὰ ἄλλην τῶν διαιρεθεισῶν κατηγοριῶν) πότερον ἐξ ἀπάντων ἔσται ἡ ψυχὴ ἢ οὐ; ἀλλ' οὐ δοκεῖ κοινὰ πάντων εἶναι στοιχεῖα. ἄρ' οὖν ὅσα τῶν οὐσιῶν ἐκ τούτων μόνον; πῶς οὖν γινώσκει καὶ τῶν ἄλλων ἕκαστον; ἢ φήσουσιν ἕκαστου γένους εἶναι στοιχεῖα καὶ ἀρχὰς ἰδίᾳς, ἐξ ὧν τὴν ψυχὴν
 20 συνεστάναι; ἔσται ἄρα ποσὸν καὶ ποιὸν καὶ οὐσία. ἀλλ' ἀδύνατον ἐκ τῶν τοῦ ποσοῦ στοιχείων οὐσίαν εἶναι καὶ μὴ ποσόν. τοῖς δὲ λέγουσιν ἐκ πάντων ταῦτά τε καὶ τοιαῦθ' ἕτερα συμβαίνει. ἄτοπον δὲ καὶ τὸ φάναι μὲν ἀπαθὲς εἶναι τὸ ὅμοιον ὑπὸ τοῦ ὁμοίου, αἰσθάνεσθαι δὲ τὸ ὅμοιον τοῦ ὁμοίου καὶ
 25 γινώσκειν τῷ ὁμοίῳ τὸ ὅμοιον. τὸ δ' αἰσθάνεσθαι πᾶσχειν τι καὶ κινεῖσθαι τιθέασιν· ὁμοίως δὲ καὶ τὸ νοεῖν τε καὶ γινώσκειν.

Πολλὰς δ' ἀπορίας καὶ δυσχερείας ἔχοντος τοῦ λέγειν, καθάπερ Ἐμπεδοκλῆς, ὡς τοῖς σωματικοῖς στοιχείοις ἕκαστα γνωρίζεται καὶ πρὸς τὸ ὅμοιον,
 30 μαρτυρεῖ τὸ νῦν λεχθέν· ὅσα γὰρ ἐνεστὶν ἐν τοῖς
 410 b τῶν ζώων σώμασιν ἀπλῶς γῆς, οἷον ὅσα νεῦρα τρίχες, οὐθενὸς αἰσθάνεσθαι δοκεῖ, ὥστ' οὐδὲ τῶν ὁμοίων. καίτοι προσῆκεν. ἔτι δ' ἐκάστη τῶν

* So that the soul can know other categories besides that of substance.

ON THE SOUL, I. v.

bone, for instance, or man, unless they exist in it. But it is unnecessary to prove that this is impossible. For who could speculate as to whether there is a stone or a man in the soul? The same argument applies to good and not-good; and so with many other things.

Again, the word "existing" is used in many senses (it means substance, quantity, quality, or any other of the different categories). Is the soul then composed of all these or not? The elements cannot surely be common to all the categories. Is the soul composed only of those which belong to the category of substance? How then is it to know each of the others? Will they maintain that the elements have each their own genus and special principles, and that the soul is composed of each of these? In that case it will be quantity, quality, and substance. But nothing can be derived from the elements of quantity without its being quantity. Those who say that the soul is composed of all the elements are confronted with these and similar difficulties. It is unreasonable to say on the one hand that like is not acted on by like, and on the other that like has perception of like, and that one recognizes like by like; but they describe perception as a form of being acted upon and as movement. And similarly with thinking and knowing.

There are many obscurities and difficulties in saying, as Empedocles does, that each thing is known by corporeal elements, as what has been already said shows. For all the elements in living creatures which are composed simply of earth, such as bone, sinews, and hair, seem to have no perception at all, even of like things; and yet on this theory they should have.

Difficulties
in the
theory.

Problems
arising from
Empedocles'
theory.

410 b

ἀρχῶν ἄγνοια πλείων ἢ σύνεσις ὑπάρξει· γνώσεται
 μὲν γὰρ ἓν ἕκαστον, πολλὰ δ' ἄγνοήσκει· πάντα
 5 γὰρ τᾶλλα. συμβαίνει δ' Ἐμπεδοκλεῖ γε καὶ
 ἀφρονέστατον εἶναι τὸν θεόν· μόνος γὰρ τῶν στοι-
 χείων ἓν οὐ γνωριεῖ, τὸ νεῖκος, τὰ δὲ θνητὰ πάντα·
 ἐκ πάντων γὰρ ἕκαστον. ὅλως τε διὰ τίν' αἰτίαν
 οὐχ ἅπαντα ψυχὴν ἔχει τὰ ὄντα, ἐπειδὴ πᾶν ἢ
 στοιχεῖον ἢ ἐκ στοιχείου ἑνὸς ἢ πλειόνων ἢ πάντων;
 10 ἀναγκαῖον γὰρ ἐστὶν ἓν τι γινώσκειν ἢ τινὰ ἢ
 πάντα. ἀπορήσειε δ' ἂν τις καὶ τί ποτ' ἐστὶ τὸ
 ἐνυποιοῦν αὐτά· ὕλη γὰρ ἔοικε τά γε στοιχεῖα·
 κυριώτατον γὰρ ἐκεῖνο τὸ συνέχον ὃ τί ποτ' ἐστίν·
 τῆς δὲ ψυχῆς εἶναί τι κρεῖττον καὶ ἄρχον ἀδύνατον·
 ἀδυνατώτερον δ' ἔστι τοῦ νοῦ· εὐλογον γὰρ τοῦτον
 15 εἶναι προγενέστατον καὶ κύριον κατὰ φύσιν, τὰ δὲ
 στοιχεῖα φασὶ πρῶτα τῶν ὄντων εἶναι.

Πάντες δὲ καὶ οἱ διὰ τὸ γνωρίζειν καὶ αἰσθάνε-
 σθαι τὰ ὄντα τὴν ψυχὴν ἐκ τῶν στοιχείων λέγοντες
 αὐτήν, καὶ οἱ τὸ κινητικώτατον, οὐ περὶ πάσης
 λέγουσι ψυχῆς· οὔτε γὰρ τὰ αἰσθανόμενα πάντα
 20 κινητικά· φαίνεται γὰρ εἶναί τινα μόνιμα τῶν ζώων
 κατὰ τόπον. καίτοι δοκεῖ γε ταύτην μόνην τῶν
 κινήσεων κινεῖν ἢ ψυχὴ τὸ ζῶον. ὁμοίως δὲ καὶ
 ὅσοι τὸν νοῦν καὶ τὸ αἰσθητικὸν ἐκ τῶν στοιχείων
 ποιοῦσιν· φαίνεται γὰρ τά τε φυτὰ ζῆν οὐ μετ-
 έχοντα φορᾶς οὐδ' αἰσθήσεως, καὶ τῶν ζώων πολλὰ

ON THE SOUL, I. v.

Again, in each of these first principles there will be more ignorance than understanding ; for each will know one thing, but will be ignorant of many, in fact of everything else. Thus Empedocles' god must be most unintelligent ; for he alone will be ignorant of one of these elements, namely strife, whereas man will know them all ; for each individual is composed of them all ; in general also why have not all existing things a soul, since everything is an element, or composed of an element, or of more than one, or of all ? For they must all know one thing, or some things, or all things. There would be a further difficulty in deciding what is the combining principle, for the elements correspond to matter ; and the combining force, whatever it is, is complete master ; but it is impossible that anything should be superior to and master of the soul, and still more impossible that it should be superior to the mind ; for it is reasonable to suppose that the mind is by nature prior and master, but they say that the elements are the first of all existing things.

Those who say that the soul is composed of the elements, because it knows and perceives existing things, and equally those who call it the chief cause of motion, do not offer an explanation which will cover every soul. For not everything which has perception has movement also ; for instance some living things seem to be stationary in space ; and yet this seems the only kind of movement which the soul imparts to the living creature. The same difficulty arises for those who construct the mind and the perceptive faculty out of the elements ; for plants seem to live without sharing in movement in space, nor in perception, and many living animals have no power

The definition will not cover all the facts.

410 b

25 διάνοιαν οὐκ ἔχειν. εἰ δέ τις καὶ ταῦτα παρα-
 χωρήσκει, καὶ θεΐη τὸν νοῦν μέρος τι τῆς ψυχῆς,
 ὁμοίως δὲ καὶ τὸ αἰσθητικόν, οὐδ' ἂν οὕτω λέγοιεν
 καθόλου περὶ πάσης ψυχῆς οὐδὲ περὶ ὅλης οὐδὲ
 μιᾶς. τοῦτο δὲ πέπονθε καὶ ὁ ἐν τοῖς Ὀρφικοῖς
 30 ἐπεσι καλουμένοις λόγος· φησὶ γὰρ τὴν ψυχὴν ἐκ
 τοῦ ὅλου εἰσιέναι ἀναπνεόντων, φερομένην ὑπὸ τῶν
 ἀνέμων. οὐχ οἷόν τε δὴ τοῖς φυτοῖς τοῦτο συμβαί-
 411 a νειν οὐδὲ τῶν ζώων ἐνίοις, εἴπερ μὴ πάντα ἀνα-
 πνέουσιν. τοῦτο δὲ λέληθε τοὺς οὕτως ὑπειληφό-
 τας. εἴ τε δεῖ τὴν ψυχὴν ἐκ τῶν στοιχείων ποιεῖν,
 οὐθὲν δεῖ ἐξ ἀπάντων· ἱκανὸν γὰρ θάτερον μέρος
 τῆς ἐναντιώσεως ἑαυτό τε κρίνειν καὶ τὸ ἀντικεί-
 5 μενον. καὶ γὰρ τῷ εὐθεῖ καὶ αὐτὸ καὶ τὸ καμπύλον
 γινώσκομεν· κριτῆς γὰρ ἀμφοῖν ὁ καινών, τὸ δὲ
 καμπύλον οὐθ' ἑαυτοῦ οὔτε τοῦ εὐθέος. καὶ ἐν τῷ
 ὅλῳ δέ τινες αὐτὴν μεμῖχθαί φασιν, ὅθεν ἴσως καὶ
 Θαλῆς ᾤήθη πάντα πλήρη θεῶν εἶναι. τοῦτο δ'
 ἔχει τινὰς ἀπορίας· διὰ τίνα γὰρ αἰτίαν ἐν μὲν τῷ
 10 ἀέρι ἢ τῷ πυρὶ οὖσα ἡ ψυχὴ οὐ ποιεῖ ζῶον, ἐν δὲ
 τοῖς μικτοῖς, καὶ ταῦτα βελτίων ἐν τούτοις εἶναι
 δοκοῦσα; ἐπιζητήσκει γὰρ ἂν τις καὶ διὰ τίν'
 αἰτίαν ἢ ἐν τῷ ἀέρι ψυχὴ τῆς ἐν τοῖς ζώοις
 βελτίων ἐστὶ καὶ ἀθανατωτέρα. συμβαίνει δ'
 ἀμφοτέρως ἄτοπον καὶ παράλογον· καὶ γὰρ τὸ
 15 λέγειν ζῶον τὸ πῦρ ἢ τὸν αἶρα τῶν παραλογω-
 τέρων ἐστὶ, καὶ τὸ μὴ λέγειν ζῶα ψυχῆς ἐνούσης
 ἄτοπον. ὑπολαβεῖν δ' εἰκόασιν εἶναι τὴν ψυχὴν

ON THE SOUL, I. v.

of thinking. But supposing one were to let this question pass, and to admit that the mind is part of the soul, and similarly the perceptive faculty, yet one could not speak generally in this way about every soul, nor about the whole of any one soul. The theory in the so-called poems of Orpheus presents the same difficulty ; for this theory alleges that the soul enters from the universe into animals when they breathe, borne by the winds. But this cannot happen to plants, nor to some animals, since they do not all breathe : a point which has escaped those who support this theory. And if we are to construct the soul out of the elements, it is quite unnecessary that it should be composed of all the elements ; for only one of a pair of opposites is needed to understand both it and its opposite. For instance, by knowing the meaning of "straight" we also know the meaning of "crooked" ; for the carpenter's rule is the test of both, but the crooked tests neither itself nor the straight. Some think that the soul pervades the whole universe, whence perhaps came 'Thales' view that everything is full of gods. But this theory contains certain difficulties ; for why does not the soul, when it is in the air and in fire, make an animal, but only when the elements are mixed, and that too though it seems to be in a purer form in the first case ? For one might ask why the soul in the air is better and less liable to death than the soul in living creatures. But in any case the conclusion is extraordinary and unreasonable ; for to describe fire or air as living creatures is too improbable, and yet to refuse to call them living creatures, if there is a soul in them, is illogical. They appear to suppose that the soul resides in these elements, because the whole

ARISTOTLE

411 a

ἐν τούτοις, ὅτι τὸ ὅλον τοῖς μορίοις ὁμοειδές. ὥστ' ἀναγκαῖον αὐτοῖς λέγειν καὶ τὴν ψυχὴν ὁμοειδῆ τοῖς μορίοις εἶναι, εἰ τῷ ἀπολαμβάνεσθαι τι τοῦ περιέχοντος ἐν τοῖς ζώοις ἔμφυχα τὰ ζῶα γίνεται. εἰ δ' ὁ μὲν ἀνὴρ διωσπώμενος ὁμοειδής, ἡ δὲ ψυχὴ ἀνομοιομερής, τὸ μὲν τι αὐτῆς ὑπάρξει δῆλον ὅτι, τὸ δ' οὐχ ὑπάρξει. ἀναγκαῖον οὖν αὐτὴν ἢ ὁμοιομερῆ εἶναι ἢ μὴ ἐνυπάρχειν ἐν ὁπωσοῦν μορίῳ τοῦ παντός.

Φανερόν οὖν ἐκ τῶν εἰρημένων ὥς οὔτε τὸ
25 γινώσκειν ὑπάρχει τῇ ψυχῇ διὰ τὸ ἐκ τῶν στοιχείων εἶναι, οὔτε τὸ κινεῖσθαι αὐτὴν καλῶς οὐδ' ἀληθῶς λέγεται. ἐπεὶ δὲ τὸ γινώσκειν τῆς ψυχῆς ἐστὶ καὶ τὸ αἰσθάνεσθαι τε καὶ τὸ δοξάζειν, ἔτι δὲ τὸ ἐπιθυμεῖν καὶ βούλεσθαι καὶ ὅλως αἰ ὀρέξεις, γίνεται δὲ καὶ ἡ κατὰ τόπον κίνησις τοῖς ζώοις
30 ὑπὸ τῆς ψυχῆς, ἔτι δ' αὔξη τε καὶ ἀκμὴ καὶ
411 b φθίσις, πότερον ὅλη τῇ ψυχῇ τούτων ἕκαστον ὑπάρχει, καὶ πάσῃ νοοῦμέν τε καὶ αἰσθανόμεθα καὶ τῶν ἄλλων ἕκαστον ποιούμεν τε καὶ πάσχομεν, ἢ μορίοις ἑτέροις ἑτερα; καὶ τὸ ζῆν δὴ πότερον ἔν τινι τούτων ἐστὶν ἐνὶ ἢ καὶ ἐν πλείοσιν
5 ἢ πᾶσιν, ἢ καὶ ἄλλο τι αἴτιον; λέγουσι δὴ τινες μεριστὴν αὐτὴν, καὶ ἄλλω μὲν νοεῖν ἄλλω δὲ ἐπιθυμεῖν. τί οὖν δὴ ποτε συνέχει τὴν ψυχὴν, εἰ μεριστὴ πέφυκεν; οὐ γὰρ δὴ τό γε σῶμα· δοκεῖ γὰρ τοῦναντίον μᾶλλον ἢ ψυχὴ τὸ σῶμα συνέχειν. ἐξελεθούσης γοῦν διαπνεῖται καὶ σήπεται. εἰ οὖν
10 ἑτερόν τι μίαν αὐτὴν ποιεῖ, ἐκεῖνο μάλιστ' ἂν εἴη ψυχὴ. δεήσει δὲ καὶ πάλιν καὶ ἐκεῖνο ζητεῖν, πότερον

ON THE SOUL, I. v.

is homogeneous with its parts ; so they are compelled to say that the soul is homogeneous with its parts, if living creatures become possessed of soul by some part of the surrounding air being cut off and enclosed in them. But if the air detached is homogeneous, while the soul has parts of different kinds, then evidently one part of the soul exists in the air, while another does not. So that either the soul must be of similar parts, or else it does not exist in any part of the universe taken at random.

From what has been said it is obvious that the faculty of knowing does not belong to the soul because it is composed of the elements, nor is it well and truly said that it moves. But since knowing, perceiving, and the forming of opinions are operations of the soul, besides desiring, wishing, and the appetites in general, and again since movement in space belongs to living creatures by reason of the soul, besides growth, the prime of life, and decay, does each of these things belong to the soul as a whole ? Do we think, perceive, and do and suffer everything else with the whole soul, or do some functions belong to one part and others to another ? Does living depend upon one of these, or upon more, or upon all, or is something else the cause ? Some say that the soul has parts, and thinks with one part, and desires with another. In this case what is it which combines the soul into a whole, if it naturally consists of parts ? Certainly not the body : on the contrary the soul seems rather to combine the body into a whole ; for when the soul is gone the body dissolves into air and decays. If then some other thing gives the soul unity, this would really be the soul. But we shall have to inquire again, whether this is a

Can the soul
be divided
into parts
according
to its
functions ?

411 b

ἐν ἡ πολυμερές. εἰ μὲν γὰρ ἓν, διὰ τί οὐκ εὐθέως
 καὶ ἡ ψυχὴ ἓν; εἰ δὲ μεριστόν, πάλιν ὁ λόγος
 ζητήσῃ τί τὸ συνέχον ἐκεῖνο, καὶ οὕτω δὴ πρόεισιν
 ἐπὶ τὸ ἄπειρον. ἀπορήσειε δ' ἂν τις καὶ περὶ τῶν
 15 μορίων αὐτῆς, τί' ἔχει δύνάμιν ἕκαστον ἐν τῷ
 σώματι. εἰ γὰρ ἡ ὅλη ψυχὴ πᾶν τὸ σῶμα συνέχει,
 προσήκει καὶ τῶν μορίων ἕκαστον συνέχειν τι τοῦ
 σώματος. τοῦτο δ' ὅμοιον ἀδυνάτῳ· ποῖον γὰρ
 μόνον ἢ πῶς ὁ νοῦς συνέξει, χαλεπὸν καὶ πλά-
 σαι. φαίνεται δὲ καὶ τὰ φυτὰ διαιρούμενα ζῆν
 20 καὶ τῶν ζώων ἔνια τῶν ἐντόμων, ὡς τὴν αὐτὴν
 ἔχοντα ψυχὴν τῷ εἶδει, εἰ καὶ μὴ ἀριθμῶ· ἑκάτεροι
 γοῦν τῶν μορίων αἰσθησιν ἔχει καὶ κινεῖται κατὰ
 τόπον ἐπὶ τινα χρόνον. εἰ δὲ μὴ διατελοῦσιν, οὐθὲν
 ἄτοπον· ὅργανα γὰρ οὐκ ἔχουσιν ὥστε σώζειν τὴν
 φύσιν. ἀλλ' οὐδὲν ἦττον ἐν ἑκατέρῳ τῶν μορίων
 25 ἅπαντ' ἐνυπάρχει τὰ μόρια τῆς ψυχῆς, καὶ ὁμοειδῆ
 εἰσιν ἀλλήλοις καὶ τῇ ὅλῃ, ἀλλήλων μὲν ὡς οὐ
 χωριστὰ ὄντα, τῆς δ' ὅλης ψυχῆς ὡς διαιρετῆς
 οὔσης. ὅμοιος δὲ καὶ ἡ ἐν τοῖς φυτοῖς ἀρχὴ ψυχῆς
 80 τις εἶναι· μόνος γὰρ ταύτης κοινωνεῖ καὶ ζῶα καὶ
 φυτὰ. καὶ αὕτη μὲν χωρίζεται τῆς αἰσθητικῆς
 ἀρχῆς, αἰσθησιν δ' οὐθὲν ἄνευ ταύτης ἔχει.

* The ms. reading is doubtful. With the present text A: must mean that supposing an animal to be divided and to continue to live there must be a soul in each segment. The

ON THE SOUL, I. v.

unit or has many parts. For if it is a unit, why should not the soul be straightway described as a unit? And if it has parts, the progress of the argument will again demand to know what is its combining principle, and thus we shall proceed *ad infinitum*. There may also be some doubt about the parts of the soul, as to what is the function of each in the body. For if the soul as a whole combines the whole body, it is natural that each of the parts should combine some part of the body. But this seems impossible; for it is hard even to imagine what part the mind will combine, or how it will do it. Moreover plants seem to live even when divided, and some of the insects also, and the parts have a soul the same in kind if not in number; for each of the parts has perception and moves in space at any rate for a short time. It is not at all surprising that they do not continue to do so; for they have not the organs necessary to maintain life. But none the less all the parts of the soul exist in each of the divided portions, and these are homogeneous^a both with each other and with the whole, not in the sense that they are separated from each other, but because the whole soul is divided. The first principle in plants, then, seems to be a kind of soul; for this alone is shared by animals and plants; and this is separate from the perceptive first principle, but no being has perception without it.

^aDifferent parts of the soul in one segment will be of the same kind as the corresponding parts in another segment, *e.g.* each segment will contain an appetitive part, and so on.

B

412 a I. Τὰ μὲν δὴ ὑπὸ τῶν πρότερον παραδεδομένα περὶ
 ψυχῆς εἰρήσθω· πάλιν δ' ὥσπερ ἐξ ὑπαρχῆς ἐπ-
 5 ἀνίωμεν, πειρώμενοι διορίσαι τί ἐστι ψυχὴ καὶ τίς
 ἂν εἴη κοινότατος λόγος αὐτῆς. λέγομεν δὴ γένος
 ἐν τι τῶν ὄντων τὴν οὐσίαν, ταύτης δὲ τὸ μὲν ὡς
 ὕλην, ὃ καθ' αὐτὸ μὲν οὐκ ἔστι τόδε τι, ἕτεροι δὲ
 μορφὴν καὶ εἶδος, καθ' ἣν ἤδη λέγεται τόδε τι,
 καὶ τρίτον τὸ ἐκ τούτων. ἔστι δ' ἡ μὲν ὕλη
 10 δύναμις, τὸ δ' εἶδος ἐντελέχεια, καὶ τοῦτο διχῶς,
 τὸ μὲν ὡς ἐπιστήμη, τὸ δ' ὡς τὸ θεωρεῖν. οὐσίαι
 δὲ μάλιστ' εἶναι δοκοῦσι τὰ σώματα, καὶ τούτων
 τὰ φυσικά· ταῦτα γὰρ τῶν ἄλλων ἀρχαί. τῶν δὲ
 φυσικῶν τὰ μὲν ἔχει ζωὴν, τὰ δ' οὐκ ἔχει· ζωὴν
 δὲ λέγομεν τὴν δι' αὐτοῦ τροφήν τε καὶ αὔξησιν
 15 καὶ φθίσιν. ὥστε πᾶν σῶμα φυσικὸν μετέχον
 ζωῆς οὐσία ἂν εἴη, οὐσία δ' οὕτως ὡς συνθέτη.
 ἐπεὶ δ' ἐστὶ σῶμα τοιόνδε, ζωὴν γὰρ ἔχον, οὐκ
 ἂν εἴη τὸ σῶμα ψυχὴ· οὐ γάρ ἐστι τῶν καθ'
 ὑποκειμένου τὸ σῶμα, μᾶλλον δ' ὡς ὑποκείμενον

^a If you have the capacity to acquire knowledge of a subject, you may be said to have potential knowledge of it, which will become actual by study. In another sense, if

BOOK II

I. The theories of the soul handed down by our predecessors have been sufficiently discussed ; now we must return to our starting-point, and try to define what the soul is, and what account of it can be given which will be the most comprehensive. We describe one class of existing things as substance ; and this we subdivide into three : (1) matter, which is in itself not any particular thing ; (2) shape or form, in virtue of which it is called some particular thing, and (3) a compound of the two. Matter is then potentiality, while form is realization or actuality, but the word actuality is used in two senses, as is illustrated by the possession of knowledge and the exercise of it.^a Bodies seem to be pre-eminently substances, and most particularly those which are of natural origin ; for these are the sources from which the rest are derived. But of natural bodies some have life and some have not ; by life we mean the capacity for self-sustenance, growth, and decay. Every natural body, then, which possesses life must be substance, and substance of the class which is a compound. Since this—having life—is predicated of a body, the body cannot be the soul, for the body is not predicated of anything else, but rather has things you possess knowledge which you are not using, it may be called potential, actual only when you are using it.

Definition of
the soul.

ARISTOTLE

412 a

20 καὶ ὕλη. ἀναγκαῖον ἄρα τὴν¹ ψυχὴν οὐσίαν εἶναι
ὥς εἶδος σώματος φυσικοῦ δυνάμει ζῶην ἔχοντος.
ἡ δ' οὐσία ἐντελέχεια. τοιούτου ἄρα σώματος
ἐντελέχεια. αὕτη δὲ λέγεται διχῶς, ἡ μὲν ὡς
ἐπιστήμη, ἡ δ' ὡς τὸ θεωρεῖν. φανερόν οὖν ὅτι
ὡς ἐπιστήμη· ἐν γὰρ τῷ ὑπάρχειν τὴν ψυχὴν καὶ
25 ὕπνος καὶ ἐγρήγορσις ἐστίν, ἀνάλογον δ' ἡ μὲν
ἐγρήγορσις τῷ θεωρεῖν, ὁ δ' ὕπνος τῷ ἔχειν καὶ
μὴ ἐνεργεῖν. προτέρα δὲ τῇ γενέσει ἐπὶ τοῦ αὐτοῦ
ἡ ἐπιστήμη. διὸ ψυχὴ ἐστίν ἐντελέχεια ἡ πρώτη
σώματος φυσικοῦ δυνάμει ζῶην ἔχοντος. τοιοῦτο

412 b δέ, ὃ ἂν ᾗ ὀργανικόν. (ὄργανα δὲ καὶ τὰ τῶν
φυτῶν μέρη, ἀλλὰ παντελῶς ἀπλᾶ, οἷον τὸ φύλλον
περικαρπίου σκέπασμα, τὸ δὲ περικάρπιον καρποῦ.
αἱ δὲ ρίζαι τῷ στόματι ἀνάλογον· ἅμφω γὰρ ἔλκει
τὴν τροφήν.) εἰ δὴ τι κοινὸν ἐπὶ πάσης ψυχῆς
6 δεῖ λέγειν, εἴη ἂν ἐντελέχεια ἡ πρώτη σώματος
φυσικοῦ ὀργανικοῦ. διὸ καὶ οὐ δεῖ ζητεῖν εἰ ἐν ἡ
ψυχῇ καὶ τὸ σῶμα, ὥσπερ οὐδὲ τὸν κηρὸν καὶ τὸ
σχῆμα, οὐδ' ὅλως τὴν ἐκάστου ὕλην καὶ τὸ οὖ
ὕλη· τὸ γὰρ ἐν καὶ τὸ εἶναι ἐπεὶ πλεοναχῶς
λέγεται, τὸ κυρίως ἡ ἐντελεχείᾳ ἐστίν.

10 Καθόλου μὲν οὖν εἴρηται τί ἐστίν ἡ ψυχὴ· οὐσία

¹ τὰν B.

^a Every "substance" is composed of two factors—matter

ON THE SOUL, II. I.

predicated of it, and is therefore matter.^a So the soul must be substance in the sense of being the form of a natural body, which potentially has life. And substance in the sense of form is actuality. The soul, then, is the actuality of the kind of body we have described. But actuality has two senses, analogous to the possession of knowledge and the exercise of it. Clearly actuality in our present sense is analogous to the possession of knowledge; for, where there is a soul, there is both sleep and wakefulness, and wakefulness is analogous to the exercise of knowledge, sleep to its possession but not its exercise. Now in any one person the possession of knowledge precedes its use. The soul may therefore be defined as the first actuality of a natural body potentially possessing life, and the body must be of a kind which possesses organs. (In plants also the parts are their organs, very simple ones, such as the leaf which covers the pod, and the pod which covers the seed; but the roots are analogous to the mouth, for both these absorb food.) If then one is to find a comprehensive definition which will apply to every soul, it is the first actuality of a natural body possessed of organs. So one can no more ask if the body and the soul are one than if the wax and the impression it receives are one, or speaking generally the matter of each thing and the form of which it is the matter; for admitting that the terms unity and existence are used in many senses, the paramount sense is that of actuality.

We have, then, given a general definition of what The soul as form. and form; *e.g.* a billiard ball. Its matter is ivory, its form spherical. An animate body, then, as it is a substance, consists of matter and form. The body must be matter, for it is not itself an attribute, but has attributes. Therefore the soul is form.

412 b

γὰρ ἡ κατὰ τὸν λόγον. τοῦτο δὲ τὸ τί ἦν εἶναι
 τῷ τοιῷδὲ σώματι, καθάπερ εἴ τι τῶν ὀργάνων
 φυσικὸν ἦν σῶμα, οἷον πέλεκυς· ἦν γὰρ ἂν τὸ
 πελέκει εἶναι ἡ οὐσία αὐτοῦ, καὶ ἡ ψυχὴ τοῦτο·
 χωρισθείσης γὰρ ταύτης οὐκ ἂν ἔτι πέλεκυς ἦν,
 15 ἀλλ' ἡ ὁμωνύμως. νῦν δ' ἐστὶ πέλεκυς· οὐ γὰρ
 τοιούτου σώματος τὸ τί ἦν εἶναι καὶ ὁ λόγος ἡ
 ψυχὴ, ἀλλὰ φυσικοῦ τοιουδὲ ἔχοντος ἀρχὴν κινή-
 σεως καὶ στάσεως ἐν ἑαυτῷ. θεωρεῖν δὲ καὶ ἐπὶ
 τῶν μερῶν δεῖ τὸ λεχθέν. εἰ γὰρ ἦν ὁ ὀφθαλμὸς
 ζῶον, ψυχὴ ἂν ἦν αὐτοῦ ἡ ὄψις· αὕτη γὰρ οὐσία
 20 ὀφθαλμοῦ ἡ κατὰ τὸν λόγον. ὁ δ' ὀφθαλμὸς ὕλη
 ὄψεως, ἧς ἀπολειπούσης οὐκ ἔστιν ὀφθαλμὸς, πλὴν
 ὁμωνύμως, καθάπερ ὁ λίθινος καὶ ὁ γεγραμμένος.
 δεῖ δὴ λαβεῖν τὸ ἐπὶ μέρους ἐφ' ὅλου τοῦ ζῶντος
 σώματος· ἀνάλογον γὰρ ἔχει ὡς τὸ μέρος πρὸς τὸ
 25 μέρος, οὕτως ἡ ὅλη αἰσθησις πρὸς τὸ ὅλον σῶμα
 τὸ αἰσθητικόν, ἡ τοιούτο. ἔστι δὲ οὐ τὸ ἀπο-
 βεβληκὸς τὴν ψυχὴν τὸ δυνάμει ὄν ὥστε ζῆν,
 ἀλλὰ τὸ ἔχον. τὸ δὲ σπέρμα καὶ ὁ καρπὸς τὸ
 δυνάμει τοιονδὲ σῶμα. ὡς μὲν οὖν ἡ τμήσις καὶ
 413 a ἡ ὄρασις, οὕτω καὶ ἡ ἐγρήγορις ἐντελέχεια, ὡς
 δ' ἡ ὄψις καὶ ἡ δύναμις τοῦ ὀργάνου, ἡ ψυχὴ· τὸ
 δὲ σῶμα τὸ δυνάμει ὄν· ἀλλ' ὥσπερ ὁ ὀφθαλμὸς ἡ

^a A.'s argument in the rest of this chapter is not quite easy to follow. The introduction of the axe seems at first irrelevant, because, as A. afterwards explains, being inanimate, it is not really parallel to the living creature. But his point is clear, the axe consists of the matter (wood and metal) of which it is composed, and its form (*i.e.* what makes it an axe—cutting edge, weight, and so forth). If you take away (*e.g.*) its edge, what remains? Still an axe, although one that will not cut. But this is not true of the living creature. It has a body which is its matter, and a soul

ON THE SOUL, II. 1.

the soul is : it is substance expressed as form.^a It is this which makes a body what it is ; supposing that instruments had a natural body, for instance an axe ; the substance of the axe would be that which makes it an axe, and this would be its soul ; suppose this removed, and it would no longer be an axe in the ordinary sense of the term. As it is, it remains an axe, because the soul is not the form of a body of this kind, but only of a natural body, which has in itself the power of movement and rest. We must therefore investigate the application of our definition to the parts of the body. If the eye were a living creature, its soul would be its power of seeing ; for this is the substance of the eye expressed as form. But the eye is the matter of seeing, and if seeing were absent, there would be no eye, except in an equivocal sense, as for instance a stone or painted eye. Now we must apply what we have found true of the part to the whole living body. For the same relationship must hold good of the part to the part, and the whole of sensation to the whole body which feels, in so far as it does so. But it is not the body which has lost its soul, which has the capacity to live, but that which possesses its soul ; so the seed and the fruit are potentially bodies of such a kind. Just as the cutting of the axe or the seeing of the eye is an actuality, so also is the waking state, and the soul is actuality in the same sense as the capacity of the eye for seeing, or of the instrument for doing its work. But the body is that which has a capacity for life ; but just as the pupil and the power of seeing make an eye, so

which is its form. Take away the latter and the body perishes, so that the whole is no longer a living creature ; by removing the form of a living creature we destroy its identity.

412 a

κόρη καὶ ἡ ὄψις, κάκει ἡ ψυχὴ καὶ τὸ σῶμα τὸ
 ζῶον. ὅτι μὲν οὖν οὐκ ἔστιν ἡ ψυχὴ χωριστὴ τοῦ
 5 σώματος, ἢ μέρη τινὰ αὐτῆς, εἰ μεριστὴ πέφυκεν,
 οὐκ ἄδηλον· ἐνίων γὰρ ἡ ἐντελέχεια τῶν μερῶν
 ἐστὶν αὐτῶν. οὐ μὴν ἀλλ' ἐνιά γε οὐθὲν κωλύει,
 διὰ τὸ μηθενὸς εἶναι σώματος ἐντελεχείας. ἔτι
 δὲ ἄδηλον εἰ οὕτως ἐντελέχεια τοῦ σώματος ἡ
 ψυχὴ ὥσπερ πλωτὴρ πλοίου. τύπῳ μὲν οὖν ταύτῃ
 10 διωρίσθω καὶ ὑπογεγράφθω περὶ ψυχῆς.

II. Ἐπεὶ δ' ἐκ τῶν ἀσαφῶν μὲν φανερωτέρων δὲ
 γίγνεται τὸ σαφές καὶ κατὰ τὸν λόγον γνωριμώ-
 τερον, πειρατέον πάλιν οὕτως ἐπελθεῖν περὶ αὐτῆς·
 οὐ γὰρ μόνον τὸ ὅτι δεῖ τὸν ὀριστικὸν λόγον δηλοῦν,
 15 ὥσπερ οἱ πλεῖστοι τῶν ὄρων λέγουσιν, ἀλλὰ καὶ
 τὴν αἰτίαν ἐνυπάρχειν καὶ ἐμφαίνεσθαι. νῦν δ'
 ὥσπερ συμπεράσμαθ' οἱ λόγοι τῶν ὄρων εἰσίν·
 οἷον τί ἐστι τετραγωνισμός; τὸ ἴσον ἑτερομήκει
 ὀρθογώνιον εἶναι ἰσόπλευρον. ὁ δὲ τοιοῦτος ὅρος
 λόγος τοῦ συμπεράσματος. ὁ δὲ λέγων ὅτι ἐστὶν
 20 ὁ τετραγωνισμὸς μέσης εὗρεσις, τοῦ πράγματος
 λέγει τὸ αἷτιον.

* Cf. Bk. I. ch. iii.

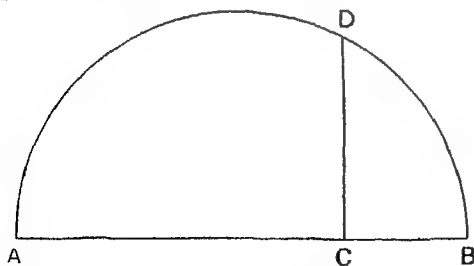
† NOTE.—The reference is to the figure opposite.

AB is a straight line divided into two parts at C. On AB a semicircle ADB is described. CD is drawn at right angles to AB to meet the circumference in D. Two conclusions can be proved. (1) The square on CD is equal to the rectangle AC.CB. (2) CD is the mean proportional between AC and CB, or in other words $AC:CD::CD:CB$. For the proofs of these two propositions cf. Euclid ii. 14 and vi. 13.

ON THE SOUL, II. I.—II.

in the other case the soul and body make a living creature. It is quite clear, then, that neither the soul nor any parts of it, if it has parts, can be separated from the body, for the actuality of some animals belongs to the parts themselves. Not but what there is nothing to prevent some parts being separated, because they are not actualities of any body. It is also uncertain whether the soul as an actuality bears the same relation to the body as the sailor to the ship.^a This then in outline is a sufficient definition and sketch of the soul.

II. But since the clear and theoretically better known conception arises from the obscure but more obvious data of sense, we must try to revise our views on the soul in this way ; for the words of a definition ought not merely to show the fact, as most definitions do, but to present the underlying cause. But so far the words of our definitions are only conclusions ; for instance, what is the definition of squaring a rectangle ? It is the construction of a square equal in area to a rectangle. Such a definition is merely a conclusion. But if a man says that squaring a rectangle is the finding of a mean proportional, he is giving the underlying cause of the fact.^b



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Λέγομεν οὖν ἀρχὴν λαβόντες τῆς σκέψεως, διωρίσθαι τὸ ἐμψυχον τοῦ ἀψύχου τῷ ζῆν. πλεοναχῶς δὲ τοῦ ζῆν λεγομένου, καὶ ἔν τι τούτων ἐνυπάρχει μόνον, ζῆν αὐτό φαμεν, οἶον νοῦς, αἴσθησις, κίνησις καὶ στάσις ἢ κατὰ τόπον, ἔτι
 25 κίνησις ἢ κατὰ τροφήν καὶ φθίσις τε καὶ αὔξεισις. διὸ καὶ τὰ φυόμενα πάντα δοκεῖ ζῆν· φαίνεται γὰρ ἐν αὐτοῖς ἔχοντα δύναμιν καὶ ἀρχὴν τοιαύτην, δι' ἧς αὔξεισιν τε καὶ φθίσιν λαμβάνουσι κατὰ τοὺς ἐναντίους τόπους· οὐ γὰρ ἄνω μὲν αὔξεται, κάτω δ' οὐ, ἀλλ' ὁμοίως ἐπ' ἄμφω καὶ πάντοσε καὶ
 80 τρέφεται καὶ ζῆν διὰ τέλους, ἕως ἂν δύνηται λαμβάνειν τροφήν. χωρίζεσθαι δὲ τοῦτο μὲν τῶν ἄλλων δυνατόν, τὰ δ' ἄλλα τούτου ἀδύνατον ἐν τοῖς θνητοῖς. φανερόν δ' ἐπὶ τῶν φυομένων·
 418 b οὐδεμία γὰρ αὐτοῖς ὑπάρχει δύναμις ἄλλη ψυχῆς. Τὸ μὲν οὖν ζῆν διὰ τὴν ἀρχὴν ταύτην ὑπάρχει τοῖς ζῶσι, τὸ δὲ ζῶον διὰ τὴν αἴσθησιν πρώτως· καὶ γὰρ τὰ μὴ κινούμενα μηδ' ἀλλάττοντα τόπον, ἔχοντα δ' αἴσθησιν ζῶα λέγομεν καὶ οὐ ζῆν μόνον.
 5 αἰσθήσεως δὲ πρῶτον ὑπάρχει πᾶσιν ἀφή. ὥσπερ δὲ τὸ θρεπτικὸν δύναται χωρίζεσθαι τῆς ἀφῆς καὶ πάσης αἰσθήσεως, οὕτως ἢ ἀφή τῶν ἄλλων αἰσθήσεων. θρεπτικὸν δὲ λέγομεν τὸ τοιοῦτον· μόνον τῆς ψυχῆς οὐ καὶ τὰ φυτὰ μετέχει· τὰ δὲ ζῶα πάντα φαίνεται τὴν ἀπτικήν αἴσθησιν ἔχοντα.
 10 δι' ἣν δ' αἰτίαν ἐκάτερον τούτων συμβέβηκεν, ὅστερον ἐροῦμεν.

Νῦν δ' ἐπὶ τοσοῦτον εἰρήσθω μόνον, ὅτι ἐστὶν ἢ

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We say then, reverting to the starting-point of our inquiry, that that which has soul is distinguished from that which has not by living. But the word living is used in many senses, and if any one of the following is present we say that the creature lives—mind, sensation, movement or position in space, besides the movement implied in getting food, decay, and growth. Consequently all plants are considered to live, for they evidently have in themselves a capacity and first principle of such a kind that they show both growth and decay, and these in opposite directions ; for they do not grow up and not down, but equally in both directions, and in every direction, and they are nourished and continue to live, as long as they are able to absorb food. This capacity to absorb food may exist apart from all other powers, but the others cannot exist apart from this, as we see in human beings. This is evident, too, in the case of plants ; for they have no other capacity of the soul.

Because of this fundamental power all living things have life, but the living animal first and foremost lives because it can feel ; for even those which do not move or change their place, but have sensation, we call living creatures, and do not merely say that they live. The first essential factor of sensation, which we all share, is a sense of touch. Just as the merely nutritive faculty may exist apart from touch and from all sensation, so touch may exist apart from all other senses. We call the nutritive faculty that part of the soul which even the plants share. But all living animals seem to possess the sense of touch. Why each of these things has happened so, we shall explain later on.

Sensation
a first
essential
of life.

But for the moment let us be satisfied with saying

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ψυχὴ τῶν εἰρημένων τούτων ἀρχὴ καὶ τούτοις
 ὥρισταί, θρεπτικῶ, αἰσθητικῶ, διανοητικῶ, κινήσει.
 πότερον δὲ τούτων ἕκαστόν ἐστι ψυχὴ ἢ μόριον
 ψυχῆς, καὶ εἰ μόριον, πότερον οὕτως ὥστ' εἶναι
 15 χωριστόν λόγῳ μόνον ἢ καὶ τόπῳ, περὶ μὲν τινῶν
 τούτων οὐ χαλεπὸν ἰδεῖν, ἔνια δὲ ἀπορίαν ἔχει.
 ὥσπερ γὰρ ἐπὶ τῶν φυτῶν ἔνια διαιρούμενα φαί-
 νεται ζῶντα καὶ χωριζόμενα ἀπ' ἀλλήλων, ὡς
 οὔσης τῆς ἐν τούτοις ψυχῆς ἐντελεχεία μὲν μιᾶς
 ἐν ἐκάστῳ φυτῷ, δυνάμει δὲ πλειόνων, οὕτως
 20 ὁρῶμεν καὶ περὶ ἐτέρας διαφορὰς τῆς ψυχῆς συμ-
 βαῖνον ἐπὶ τῶν ἐντόμων ἐν τοῖς διατεμνομένοις.
 καὶ γὰρ αἰσθησιν ἑκάτερον τῶν μερῶν ἔχει καὶ
 κίνησιν τὴν κατὰ τόπον, εἰ δ' αἰσθησιν, καὶ φαν-
 τασίαν καὶ ὄρεξιν· ὅπου μὲν γὰρ αἰσθησις, καὶ
 λύπη τε καὶ ἡδονή, ὅπου δὲ ταῦτα, ἐξ ἀνάγκης
 25 καὶ ἐπιθυμία. περὶ δὲ τοῦ νοῦ καὶ τῆς θεωρητικῆς
 δυνάμεως οὐδέν πω φανερόν, ἀλλ' ἔοικε ψυχῆς
 γένος ἕτερον εἶναι, καὶ τοῦτο μόνον ἐνδέχεται
 χωρίζεσθαι, καθάπερ τὸ αἰδίδιον τοῦ φθαρτοῦ. τὰ
 δὲ λοιπὰ μόρια τῆς ψυχῆς φανερόν ἐκ τούτων ὅτι
 οὐκ ἔστι χωριστά, καθάπερ τινὲς φασιν· τῷ δὲ
 80 λόγῳ ὅτι ἕτερα, φανερόν· αἰσθητικῶ γὰρ εἶναι καὶ
 δοξαστικῶ ἕτερον, εἴπερ καὶ τὸ αἰσθάνεσθαι τοῦ
 δοξάζειν. ὁμοίως δὲ καὶ τῶν ἄλλων ἕκαστον τῶν
 εἰρημένων. ἔτι δ' ἐνίοις μὲν τῶν ζώων ἀπανθ'
 ὑπάρχει ταῦτα, τισὶ δὲ τίνα τούτων, ἐτέροις δὲ ἐν
 414 a μόνον. τοῦτο δὲ ποιεῖ διαφορὰν τῶν ζώων· διὰ
 τίνα δ' αἰτίαν, ὕστερον ἐπισκεπτέον. παραπλήσιον
 δὲ καὶ περὶ τὰς αἰσθήσεις συμβέβηκεν· τὰ μὲν γὰρ

^a Cf. Introduction.

ON THE SOUL, II. II.

that the soul is the origin of the characteristics we have mentioned, and is defined by them, that is by the faculties of nutrition, sensation, thought and movement. The further questions, whether each of these faculties is a soul, or part of a soul, and, if a part, whether a part in the sense that it is only separable in thought or also in fact, are in some cases easy of solution, but in some they involve difficulty. For just as in the case of plants some parts clearly live when divided and separated from each other, so that the soul in them appears to be one in actuality in each whole plant, but potentially more than one, so we can see that in other characteristics of the soul the same thing happens among insects in the divided pieces ; for each of the parts has sensation and movement in space ; and, if it has sensation, it must also have imagination ^a and appetite ; for, where sensation is, there is also pain and pleasure, and where these are there must also be desire. But in the case of the mind and the thinking faculty nothing is yet clear, but it seems to be a distinct species of soul, and it alone admits of being separated, as the immortal from the perishable. But it is quite clear from what we have said that the other parts of the soul are not separable, as some say ; though it is obvious that they are theoretically different ; for there is a difference between the faculties of sensation and thought, just as feeling is different from thinking. And the same thing is true of all the other faculties we have mentioned. Again, some animals have all these capacities, some only some of them, and others again only one. It is this which will constitute the differences in animals. The reason for this must be considered later. But a similar thing is true about sensations ;

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ἔχει πάσας, τὰ δὲ τινάς, τὰ δὲ μίαν τὴν ἀναγκαιοτάτην, ἀφήν.

- Ἐπεὶ δὲ ᾧ ζῶμεν καὶ αἰσθανόμεθα διχῶς λέγεται, καθάπερ ᾧ ἐπιστάμεθα (λέγομεν δὲ τὸ μὲν ἐπιστήμην τὸ δὲ ψυχὴν· ἑκατέρῳ γὰρ τούτων φαμέν ἐπίστασθαι)· ὁμοίως δὲ καὶ ᾧ ὑγιαίνομεν, τὸ μὲν ὑγίεια, τὸ δὲ μορίῳ τινὶ τοῦ σώματος ἢ καὶ ὅλῳ. τούτων δ' ἡ μὲν ἐπιστήμη τε καὶ ὑγίεια μορφή
 10 καὶ εἶδος τι καὶ λόγος καὶ οἶον ἐνέργεια τοῦ δεκτικοῦ, ἡ μὲν τοῦ ἐπιστημονικοῦ, ἡ δὲ τοῦ ὑγιαστικοῦ (δοκεῖ γὰρ ἐν τῷ πάσχοντι καὶ διατιθεμένῳ ἢ τῶν ποιητικῶν ὑπάρχειν ἐνέργεια), ἡ ψυχὴ δὲ τοῦτο ᾧ ζῶμεν καὶ αἰσθανόμεθα καὶ διανοούμεθα πρῶτως, ὥστε λόγος τις ἂν εἴη καὶ εἶδος, ἀλλ'
 15 οὐχ ὕλη καὶ τὸ ὑποκείμενον. τριχῶς γὰρ λεγομένης τῆς οὐσίας, καθάπερ εἵπομεν, ὣν τὸ μὲν εἶδος, τὸ δὲ ὕλη, τὸ δὲ ἐξ ἀμφοῖν· τούτων δ' ἡ μὲν ὕλη δύναμις, τὸ δὲ εἶδος ἐντελέχεια· ἐπεὶ δὲ τὸ ἐξ ἀμφοῖν ἔμψυχον, οὐ τὸ σῶμά ἐστιν ἐντελέχεια ψυχῆς, ἀλλ' αὕτη σῶματός τινος. καὶ διὰ τοῦτο
 20 καλῶς ὑπολαμβάνουσιν οἷς δοκεῖ μήτ' ἄνευ σώματος εἶναι μήτε σῶμά τι ἢ ψυχὴ· σῶμα μὲν γὰρ οὐκ ἔστι, σῶματος δέ τι, καὶ διὰ τοῦτο ἐν σώματι ὑπάρχει, καὶ ἐν σώματι τοιούτῳ, καὶ οὐχ ὥσπερ οἱ πρότερον εἰς σῶμα ἐνήρμοζον αὐτήν, οὐθὲν προσδιορίζοντες ἐν τίνι καὶ ποίῳ, καίπερ οὐδὲ
 25 φαινομένου τοῦ τυχόντος δέχεσθαι τὸ τυχόν. οὕτω

ON THE SOUL, II. II.

for some animals have all, some only some, and some again one only—the most indispensable—touch.

The phrase “whereby we live and feel” is used in two senses, just as the phrase “whereby we know” (in the one sense we mean knowledge and in the other the soul; for we can say that we know by each of these); similarly the phrase “whereby we are healthy” may mean health, or it may mean some part or the whole of the body. Now of these, knowledge in the one case and health in the other are the shape and in a sense the form or notion, and the actuality of the recipient of knowledge in the one case, and health in the other. (For it is upon that which is affected and in a given condition that the activity of what is producing an effect seems to operate,) but the soul is that whereby we live and feel and think in the most fundamental sense, so that the soul would be the notion or form, and not the matter and underlying material. As we have already said,^a substance is used in three senses, form, matter, and a compound of the two. Of these matter is potentiality, and form actuality; and since what has soul is a compound of the two, the body cannot be the actuality of a soul, but the soul is the actuality of some body. For this reason those are right in their view who maintain that the soul cannot exist without the body, but the soul is not in any sense a body. It is not a body, but it is something connected with a body, and exists in a body, and in a body of a particular kind, not at all as our predecessors supposed, who fitted it to any body, without adding any limitations as to what body or what kind of body, although it must be evident that no chance thing can admit any other chance thing. But it happens in this way

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δὲ γίνεται καὶ κατὰ λόγον· ἐκάστου γὰρ ἡ ἐντελέχεια ἐν τῷ δυνάμει ὑπάρχοντι καὶ τῇ οἰκείᾳ ὕλῃ πέφυκεν ἐγγίνεσθαι. ὅτι μὲν οὖν ἐντελέχειά τις ἐστὶ καὶ λόγος τοῦ δύνανμιν ἔχοντος εἶναι τοιούτου, φανερόν ἐκ τούτων.

III. Τῶν δὲ δυνάμεων τῆς ψυχῆς αἱ λεχθεῖσαι τοῖς
 80 μὲν ὑπάρχουσι πᾶσαι, καθάπερ εἵπομεν, τοῖς δὲ
 τινὲς αὐτῶν, ἐνίοις δὲ μία μόνη. δυνάμεις δ'
 εἵπομεν θρεπτικόν, ὀρεκτικόν, αἰσθητικόν, κινη-
 τικόν κατὰ τόπον, διανοητικόν. ὑπάρχει δὲ τοῖς
 414 b μὲν φυτοῖς τὸ θρεπτικόν μόνον, ἐτέροις δὲ τοῦτό
 τε καὶ τὸ αἰσθητικόν. εἰ δὲ τὸ αἰσθητικόν, καὶ
 τὸ ὀρεκτικόν· ὀρεξεις μὲν γὰρ ἐπιθυμία καὶ θυμὸς
 καὶ βούλησις, τὰ δὲ ζῶα πάντ' ἔχουσι μίαν γε
 τῶν αἰσθησεων, τὴν ἀφήν· ᾧ δ' αἰσθησις ὑπάρχει,
 5 τούτῳ ἡδονή τε καὶ λύπη καὶ τὸ ἡδύ τε καὶ
 λυπηρόν, οἷς δὲ ταῦτα, καὶ ἡ ἐπιθυμία· τοῦ γὰρ
 ἡδέος ὀρεξις αὕτη. ἔτι δὲ τῆς τροφῆς αἰσθησιν
 ἔχουσιν· ἡ γὰρ ἀφή τῆς τροφῆς αἰσθησις· ξηροῖς
 γὰρ καὶ ὑγροῖς καὶ θερμοῖς καὶ ψυχροῖς τρέφεται
 τὰ ζῶα πάντα, τούτων δ' αἰσθησις ἀφή· τῶν δ'
 10 ἄλλων αἰσθητῶν κατὰ συμβεβηκός· οὐθέν γὰρ εἰς
 τροφήν συμβάλλεται ψόφος οὐδὲ χρῶμα οὐδὲ
 ὄσμή. ὁ δὲ χυμὸς ἐν τι τῶν ἀπτῶν ἐστίν. πείνα
 δὲ καὶ δίψα ἐπιθυμία, καὶ ἡ μὲν πείνα ξηροῦ καὶ
 θερμοῦ, ἡ δὲ δίψα ψυχροῦ καὶ ὑγροῦ· ὁ δὲ χυμὸς
 οἷον ἡδυσμά τι τούτων ἐστίν. διασαφητέον δὲ
 15 περὶ αὐτῶν ὕστερον, νῦν δ' ἐπὶ τοσοῦτον εἰρήσθω,
 ὅτι τῶν ζώων τοῖς ἔχουσιν ἀφήν καὶ ὀρεξις ὑπ-
 ἄρχει. περὶ δὲ φαντασίας ἄδηλον, ὕστερον δ' ἐπι-

^a i.e. on general grounds we should expect a particular soul to belong to a particular body.

ON THE SOUL, II. II.—III.

quite reasonably^a; for the actuality of each thing is naturally inherent in its potentiality, that is in its own proper matter. From all this it is clear that the soul is the actuality and form of that which has the capacity of having a soul.

III. But of the faculties of the soul which we have mentioned, some living things have all, others only some, and others again only one. Those we have mentioned are the faculty for nourishment, for appetite,^b for sensation, for movement in space, and for thought. Plants have the nutritive faculty only, but other living things have this and the faculty for sensation. But if for sensation then also for appetite; for appetite consists of desire, anger, and wish, and all animals have one of the senses, that of touch; but that which has sensation knows pleasure and pain, the pleasant and the painful, and that which knows these has also desire; for desire is an appetite for what is pleasant. They have also a sensation in feeding; for touch is the sense which apprehends food. All animals, again, are nourished by food, which is dry or wet, hot or cold, and touch is the sense which apprehends these; the other objects of sense are only indirectly apprehended by touch; for neither sound, nor colour, nor smell contribute anything to nourishment. But flavour is one of the things apprehended by touch. Hunger and thirst are desire, the former for what is dry and hot, the latter for what is cold and wet; and flavour is a kind of sweetening of these things. We must be precise about these subjects later, but for the moment it is enough to say, that those animals which have a sense of touch have also appetite. As for imagination it is

All living creatures have not all faculties.

^a Appetite is not included in the list in 413 b 13.

414 b

σκεπτέον. ἐνίοις δὲ πρὸς τούτοις ὑπάρχει καὶ τὸ κατὰ τόπον κινήτικόν, ἑτέροις δὲ καὶ τὸ διανοητικόν τε καὶ νοῦς, οἷον ἀνθρώποις καὶ εἴ τι τοιοῦτον ἕτερόν ἐστιν ἢ καὶ τιμιώτερον.

- 20 Δῆλον οὖν ὅτι τὸν αὐτὸν τρόπον εἰς ἂν εἴη λόγος ψυχῆς τε καὶ σχήματος· οὔτε γὰρ ἐκεῖ σχῆμα παρὰ τὸ τρίγωνόν ἐστι καὶ τὰ ἐφεξῆς, οὔτ' ἐνταῦθα ψυχὴ παρὰ τὰς εἰρημένας. γένοιτο δ' ἂν καὶ ἐπὶ τῶν σχημάτων λόγος κοινός, ὃς ἐφαρμόσει μὲν πᾶσιν, ἴδιος δ' οὐδενὸς ἔσται σχήματος. ὁμοίως
25 δὲ καὶ ἐπὶ ταῖς εἰρημέναις ψυχαῖς. διὸ γελοῖον ζητεῖν τὸν κοινὸν λόγον καὶ ἐπὶ τούτων καὶ ἐφ' ἑτέρων, ὃς οὐδενὸς ἔσται τῶν ὄντων ἴδιος λόγος, οὐδὲ κατὰ τὸ οἰκείον καὶ ἄτομον εἶδος, ἀφέντας τὸν τοιοῦτον.

- Παραπλησίως δ' ἔχει τῷ περὶ τῶν σχημάτων καὶ τὰ κατὰ ψυχὴν· αἰεὶ γὰρ ἐν τῷ ἐφεξῆς
30 ὑπάρχει δυνάμει τὸ πρότερον ἐπὶ τε τῶν σχημάτων καὶ ἐπὶ τῶν ἐμψύχων, οἷον ἐν τετραγώνῳ μὲν τρίγωνον, ἐν αἰσθητικῷ δὲ τὸ θρεπτικόν. ὥστε καθ' ἕκαστον ζητητέον, τίς ἐκάστου ψυχῆ, οἷον τίς φυτοῦ καὶ τίς ἀνθρώπου ἢ θηρίου. διὰ τίνα
415 a δ' αἰτίαν τῷ ἐφεξῆς οὕτως ἔχουσι, σκεπτέον. ἄνευ μὲν γὰρ τοῦ θρεπτικοῦ τὸ αἰσθητικὸν οὐκ ἔστιν· τοῦ δ' αἰσθητικοῦ χωρίζεται τὸ θρεπτικὸν ἐν τοῖς φυτοῖς. πάλιν δ' ἄνευ μὲν τοῦ ἀπτικοῦ τῶν ἄλλων αἰσθήσεων οὐδεμία ὑπάρχει, ἀφ' ἧς δ'

^a The argument of this paragraph is as follows: Just as figure has a definition applicable to all varieties of figures, so soul has a similar "common" definition; but this can only be discovered by a patient study of individual souls, e.g. of man, animal, and plant.

ON THE SOUL, II. III.

a matter of doubt, and must be considered later. In addition to these senses some also possess the power of movement in space, and others again the power of thinking and mind, namely, man, and any other being which may be superior to him.

So it is clear that in the same way there should be one definition of soul as there is of rectilinear figure ; for in the latter case there is no figure besides the triangle and those that follow from it (*i.e.* quadrilateral, pentagon, etc.), nor is there any soul besides those we have mentioned. It would be possible in the case of figures also to frame a common definition, which would fit them all, but would be descriptive of no particular figure. And similarly in the case of the kinds of soul we have mentioned. So that it would be ridiculous to look for the common definition in this case as in others, which is the particular definition of no existing thing, and has no reference to any particular or individual species, while we neglect such a particular definition.^a

The facts regarding the soul are in the same position as those concerned with figures ; for in any series the first term has always a potential existence, both in the case of figures and of what possesses soul ; for instance the triangle is implied by the quadrilateral, and the nutritive faculty by the sensitive. We must then inquire in each several case, what is the soul of each individual, for instance of the plant, the man, and the beast. But we must also consider why they are thus arranged in a series. For without the nutritive faculty the sensitive does not exist, and in plants the nutritive is divorced from the sensitive faculty. Again, without the sense of touch none of the other senses exist, but touch may exist without

definition
of soul

similar to
mathemati-
cal defini-
tion.

415 a

ἄνευ τῶν ἄλλων ὑπάρχει· πολλὰ γὰρ τῶν ζώων οὐτ' ὄψιν οὐτ' ἀκοὴν ἔχουσιν οὐτ' ὁσμῆς ὅλως αἰσθῆσιν. καὶ τῶν αἰσθητικῶν δὲ τὰ μὲν ἔχει τὸ κατὰ τόπον κινητικόν, τὰ δ' οὐκ ἔχει. τελευταῖον δὲ καὶ ἐλάχιστα λογισμὸν καὶ διάνοιαν· οἷς μὲν γὰρ ὑπάρχει λογισμὸς τῶν φθαρτῶν, τούτοις καὶ
 10 τὰ λοιπὰ πάντα, οἷς δ' ἐκείνων ἕκαστον, οὐ πᾶσι λογισμὸς, ἀλλὰ τοῖς μὲν οὐδὲ φαντασία, τὰ δὲ ταύτῃ μόνῃ ζῶσιν. περὶ δὲ τοῦ θεωρητικοῦ νοῦ ἕτερος λόγος. ὅτι μὲν οὖν ὁ περὶ τούτων ἕκαστου λόγος οὗτος οἰκειότατος καὶ περὶ ψυχῆς, δῆλον.

IV. Ἀναγκαῖον δὲ τὸν μέλλοντα· περὶ τούτων
 15 σκέψιν ποιεῖσθαι λαβεῖν ἕκαστον αὐτῶν τί ἐστίν, εἰθ' οὕτως περὶ τῶν ἐχομένων ἢ καὶ περὶ τῶν ἄλλων ἐπιζητεῖν. εἰ δὲ χρή λέγειν τί ἕκαστον αὐτῶν, οἷον τί τὸ νοητικόν ἢ τὸ αἰσθητικόν ἢ τὸ θρεπτικόν, πρότερον ἔτι λεκτέον τί τὸ νοεῖν καὶ τί τὸ αἰσθάνεσθαι· πρότερον γὰρ εἰσι τῶν δυνάμεων αἱ
 20 ἐνέργειαι καὶ αἱ πράξεις κατὰ τὸν λόγον. εἰ δ' οὕτως, τούτων δ' ἔτι πρότερα τὰ ἀντικείμενα δεῖ τεθεωρηκέναι, περὶ ἐκείνων πρῶτον ἂν δέοι δι-
 ορίσαι διὰ τὴν αὐτὴν αἰτίαν, οἷον περὶ τροφῆς καὶ αἰσθητοῦ καὶ νοητοῦ. ὥστε πρῶτον περὶ τροφῆς καὶ γεννήσεως λεκτέον· ἢ γὰρ θρεπτικὴ ψυχὴ καὶ
 25 δυνάμεις ἐστὶ ψυχῆς, καθ' ἣν ὑπάρχει τὸ ζῆν ἅπασιν. ἥς ἐστὶν ἔργα γεννῆσαι καὶ τροφῇ χρῆσθαι· φυσικώτατον γὰρ τῶν ἔργων τοῖς ζῶσιν,

^a We proceed from the exercise of the functions, which we know and see, to assume the existence of the faculty; nature proceeds in the opposite order.

^b A. identifies the origin of growth and reproduction,

ON THE SOUL, II. III.—IV.

any others ; for many of the animals have neither vision nor hearing nor, generally speaking, any sense of smell. Again, of those possessing feeling, some have movement in space, and some have not. And lastly, and most rarely, living creatures have power of reasoning and thought. For those perishable creatures which have reasoning power have all the other powers as well, but those who have any one of them have not all reasoning power, but some have not even imagination, while others can be called living in virtue of this alone. The consideration of the speculative faculty is another question. But it is clear that the account of each of these faculties is also the most relevant account that can be given of the soul.

IV. If one intends to investigate these faculties, one must first inquire what each of them is, and then proceed to inquire about the next and other questions. But if one is to ask what each of them is, such as the thinking, sensitive, or nutritive faculty, one must first examine the meaning of acts of thinking or feeling ; for in our reasoning^a the exercise of their functions comes before the faculties themselves. And if this is so, and if one should first of all examine the objects upon which the faculties are exercised, then for the same reason one must first of all lay down definitions of food, the thing felt, or the thing thought. First, then, we must speak of food and reproduction ; for the nutritive soul belongs to all other living creatures besides man, and is the first and most widely shared faculty of the soul, in virtue of which they all have life. The functions of the nutritive faculty are to reproduce and to use food.^b For this is the most

^aThe method
of inquiry.

because food is needed both for the survival of the individual and for the reproduction of the species.

ARISTOTLE

415 a ὅσα τέλεια καὶ μὴ πηρώματα, ἢ τὴν γένεσιν αὐτο-
 μάτην ἔχει, τὸ ποιῆσαι ἕτερον οἶον αὐτό, ζῶον
 μὲν ζῶον, φυτὸν δὲ φυτόν, ἵνα τοῦ ἀεὶ καὶ τοῦ
 415 b θείου μετέχωσιν ἢ δύνανται· πάντα γὰρ ἐκείνου
 ὀρέγεται, καὶ ἐκείνου ἕνεκα πράττει ὅσα πράττει κατὰ
 φύσιν. τὸ δ' οὐ ἕνεκα, διττόν, τὸ μὲν οὐ, τὸ δὲ
 ᾧ. ἐπεὶ οὖν κοινωνεῖν ἀδυνατεῖ τοῦ ἀεὶ καὶ τοῦ
 θείου τῇ συνεχείᾳ, διὰ τὸ μηδὲν ἐνδέχεσθαι τῶν
 5 φθαρτῶν ταῦτό καὶ ἐν ἀριθμῷ διαμένειν, ἢ δύναται
 μετέχειν ἑκαστον, κοινωνεῖ ταύτῃ, τὸ μὲν μᾶλλον
 τὸ δ' ἥττον· καὶ διαμένει οὐκ αὐτὸ ἀλλ' οἶον αὐτό,
 ἀριθμῷ μὲν οὐχ ἓν, εἶδει δ' ἓν.

Ἔστι δὲ ἡ ψυχὴ τοῦ ζῶντος σώματος αἰτία καὶ
 10 ἀρχή. ταῦτα δὲ πολλαχῶς λέγεται. ὁμοίως δ' ἡ
 ψυχὴ κατὰ τοὺς διωρισμένους τρόπους τρεῖς αἰτία·
 καὶ γὰρ ὅθεν ἡ κίνησις αὐτῇ, καὶ οὐ ἕνεκα, καὶ ὡς
 ἡ οὐσία τῶν ἐμψύχων σωμάτων ἡ ψυχὴ αἰτία.
 ὅτι μὲν οὖν ὡς οὐσία, δῆλον· τὸ γὰρ αἷτιον τοῦ
 εἶναι πᾶσιν ἡ οὐσία, τὸ δὲ ζῆν τοῖς ζῶσι τὸ εἶναι
 ἐστίν, αἰτία δὲ καὶ ἀρχὴ τούτων ἡ ψυχὴ. ἔτι τοῦ
 15 δυνάμει ὄντος λόγος ἡ ἐντελέχεια. φανερόν δ' ὡς
 καὶ οὐ ἕνεκεν ἡ ψυχὴ αἰτία· ὥσπερ γὰρ ὁ νοῦς

^a Cf. *Metaph.* 983 a 26 "the word cause is used . . .

(1) as the essential nature, (2) as the source of movement, (3) as the final cause."

^b The word form here can best be understood by reference to A.'s own analogy. The wax is the "matter" of the seal, but it is only potentially a seal. When the die is impressed on the wax, the matter receives "form" and becomes "actualized" as a seal.

ON THE SOUL, II. iv.

natural of all functions among living creatures, provided that they are perfect and not maimed, and do not have spontaneous generation. Each produces another creature like itself; an animal produces an animal, and a plant a plant, in order that they may have a share in the immortal and divine in the only way they can; for every creature strives for this, and this is the final cause of all its natural functions. But *final cause* has two meanings, the person for whose sake and the object for the sake of which an action is done. Since, then, they cannot share in the immortal and divine by continuity of existence, because no perishable thing can remain numerically one and the same, they share in these in the only way they can, some to a greater and some to a less extent; what persists is not the individual itself, but something in its image, not identical as a unit, but identical in form.

But the soul is the cause and first principle of the living body. The words cause and first principle are used in several separate senses. But the soul is equally the cause in each of the three senses to which we have referred ^a; for it is the cause in the sense of being that from which motion is derived, in the sense of the purpose or final cause, and as being the substance of all bodies that have souls. (1) That the soul is the cause in the sense of substance is obvious; for substance is the cause of existence in all things, and in living creatures life is their existence, and of these the soul is the cause and first principle. Also actuality is the form of that which exists potentially.^b (2) And it is clear that the soul is the cause in the sense of the final cause. For just as the mind acts

*The nature
of the soul.*

ARISTOTLE

415 b

ἐνεκά του ποιεῖ, τὸν αὐτὸν τρόπον καὶ ἡ φύσις,
καὶ τοῦτ' ἔστιν αὐτῇ τέλος. τοιοῦτον δ' ἐν τοῖς
ζώοις ἡ ψυχὴ καὶ κατὰ φύσιν· πάντα γὰρ τὰ
φυσικὰ σώματα τῆς ψυχῆς ὄργανα, καὶ καθάπερ
20 τὰ τῶν ζώων, οὕτω καὶ τὰ τῶν φυτῶν, ὡς ἐνεκα
τῆς ψυχῆς ὄντα. διττῶς δὲ τὸ οὗ ἐνεκα, τό τε
οὐ καὶ τὸ ᾧ. ἀλλὰ μὴν καὶ ὅθεν πρῶτον ἡ κατὰ
τόπον κίνησις, ψυχὴ· οὐ πᾶσι δ' ὑπάρχει τοῖς
ζώοις ἡ δύναμις αὕτη. ἔστι δὲ καὶ ἀλλοιώσεις καὶ
αὔξεις κατὰ ψυχὴν· ἡ μὲν γὰρ αἰσθησις ἀλλοιώσις
25 τις εἶναι δοκεῖ, αἰσθάνεται δ' οὐθὲν ὃ μὴ ἔχει
ψυχὴν. ὁμοίως δὲ καὶ περὶ αὔξεσός τε καὶ
φθίσεως ἔχει· οὐδὲν γὰρ φθίνει οὐδ' αὔξεται
φυσικῶς μὴ τρεφόμενον, τρέφεται δ' οὐθὲν ὃ μὴ
κοινωνεῖ ζωῆς.

Ἐμπεδοκλῆς δ' οὐ καλῶς εἶρηκε τοῦτο, προσ-
τιθεὶς τὴν αὔξην συμβαίνειν τοῖς φυτοῖς κάτω.
18 a μὲν συρριζουμένοις διὰ τὸ τὴν γῆν οὕτω φέρεσθαι
κατὰ φύσιν, ἄνω δὲ διὰ τὸ πῦρ ὡσαύτως. οὔτε
γὰρ τὸ ἄνω καὶ κάτω καλῶς λαμβάνει· οὐ γὰρ
ταῦτο πᾶσι τὸ ἄνω καὶ κάτω καὶ τῷ παντί, ἀλλ'
ὡς ἡ κεφαλὴ τῶν ζώων, οὕτως αἱ ρίζαι τῶν φυτῶν,
5 εἰ χρὴ τὰ ὄργανα λέγειν ἕτερα καὶ ταῦτά τοῖς
ἔργοις. πρὸς δὲ τούτοις τί τὸ συνέχον εἰς τὰναντία
φερόμενα τὸ πῦρ καὶ τὴν γῆν; διασπασθήσεται
γάρ, εἰ μὴ τι ἔσται τὸ κωλύσον· εἰ δ' ἔσται, τοῦτ'
ἔστιν ἡ ψυχὴ καὶ τὸ αἷτιον τοῦ αὔξάνεσθαι καὶ
τρέφεσθαι.

ON THE SOUL, II. iv.

with some end in view, so in the same way does nature, and this is its end. This, then, is the nature of the soul among living creatures, and this is in accordance with nature ; for all natural bodies are the instruments of the soul, and just as is the case with the bodies of animals, so with those of plants, in the sense that they exist for the sake of the soul. But the phrase "for the sake of" has two meanings—"for whom?" and "for what?" (3) Lastly, the soul is the cause whence movement is derived in the first place ; but this capacity does not belong to all living creatures. Change of state and growth are also due to the soul ; for sensation is in a sense change of state, and nothing feels which has not a soul. The same is true about growth and decay ; for nothing dies nor grows in nature, unless it is fed, and nothing is fed which does not share in life.

Empedocles is mistaken in his account of this, when he adds that the growth in plants, when their roots spread downwards, is due to the fact that earth naturally tends in this direction, and that when they grow upwards, it is due to the natural movement of fire. Nor is his theory of "upwards" and "downwards" correct ; for upwards and downwards are not the same for every thing in every case, but the function performed by the head in animals is performed by the roots in plants, if we are to identify and distinguish organs by their functions. But in addition to this, what is it which connects the fire and the earth tending in opposite directions ? For they will be violently separated, unless there is something to prevent this ; but if there is anything of the sort this will be the soul, and therefore the cause of growth and nourishment.

10 Δοκεῖ δέ τισιν ἡ τοῦ πυρὸς φύσις ἀπλῶς αἰτία τῆς τροφῆς καὶ τῆς αὐξήσεως εἶναι· καὶ γὰρ αὐτὸ φαίνεται μόνον τῶν σωμάτων ἢ τῶν στοιχείων τρεφόμενον καὶ αὐξόμενον. διὸ καὶ ἐν τοῖς φυτοῖς καὶ ἐν τοῖς ζώοις ὑπολάβοι τις ἂν τοῦτο εἶναι τὸ ἐργαζόμενον. τὸ δὲ συναίτιον μὲν πῶς
 15 ἔστιν, οὐ μὴν ἀπλῶς γε αἷτιον, ἀλλὰ μᾶλλον ἢ ψυχῇ· ἡ μὲν γὰρ τοῦ πυρὸς αὐξήσεις εἰς ἄπειρον, ἕως ἂν ᾗ τὸ καυστόν, τῶν δὲ φύσει συνισταμένων πάντων ἔστι πέρας καὶ λόγος μεγέθους τε καὶ αὐξήσεως· ταῦτα δὲ ψυχῆς, ἀλλ' οὐ πυρός, καὶ λόγου μᾶλλον ἢ ὕλης.

Ἐπεὶ δ' ἡ αὐτὴ δύναμις τῆς ψυχῆς θρεπτικὴ
 20 καὶ γεννητικὴ, περὶ τροφῆς ἀναγκαῖον διωρίσθαι πρῶτον· ἀφορίζεται γὰρ πρὸς τὰς ἄλλας δυνάμεις τῷ ἔργῳ τούτῳ. δοκεῖ δ' εἶναι ἡ τροφή τὸ ἐναντίον τῷ ἐναντίῳ, οὐ πᾶν δὲ παντί, ἀλλ' ὅσα τῶν ἐναντίων μὴ μόνον γένεσιν ἐξ ἀλλήλων ἔχουσιν ἀλλὰ καὶ αὐξήσιν· γίνεται γὰρ πολλὰ ἐξ ἀλλήλων,
 25 ἀλλ' οὐ πάντα ποσά, οἷον ὕγιες ἐκ κάμνοντος. φαίνεται δ' οὐδ' ἐκεῖνα τὸν αὐτὸν τρόπον ἀλλήλοις εἶναι τροφή, ἀλλὰ τὸ μὲν ὕδωρ τῷ πυρὶ τροφή, τὸ δὲ πῦρ οὐ τρέφει τὸ ὕδωρ. ἐν μὲν οὖν τοῖς ἀπλοῖς σώμασι ταῦτ' εἶναι δοκεῖ μάλιστα τὸ μὲν τροφή τὸ δὲ τρεφόμενον. ἀπορίαν δ' ἔχει· φασὶ γὰρ οἱ
 80 μὲν τὸ ὅμοιον τῷ ὁμοίῳ τρέφεσθαι, καθάπερ καὶ αὐξάνεσθαι, τοῖς δ' ὥσπερ εἶπομεν τοῦμπαλιν δοκεῖ, τὸ ἐναντίον τῷ ἐναντίῳ, ὥς ἀπαθοῦς ὄντος τοῦ ὁμοίου ὑπὸ τοῦ ὁμοίου, τὴν δὲ τροφήν μεταβάλλειν καὶ πέττεσθαι· ἡ δὲ μεταβολὴ πᾶσιν εἰς τὸ ἀντι-

ON THE SOUL, II. iv.

To some the nature of fire seems by itself to be the cause of nutrition and growth ; for it alone of all bodies and elements seems to be nourished and grow of itself. So that one might suppose that it was the operating principle in plants and animals. It may perhaps be a contributory cause, but it is not the primary cause, which is much more properly the soul ; for the growth of fire is without limit, so long as there is something to be burned, but of all things existing in nature there is a limit and a principle of size and growth ; this is due to the soul, not to fire, and to form rather than to matter.

Fire in
relation to
growth.

But since nutrition and generation are the same faculty of the soul, we must first define nutriment carefully ; the nutritive faculty is separated from the other faculties by its function of feeding. There is a general opinion that opposites are nutriment to opposites ; not of course in every case, but among such opposites as have not merely their birth from each other, but their growth as well ; for many things arise from each other, but they are not all quantities ; for instance, health from illness. But not even the things mentioned seem to be food for each other in the same way ; water feeds fire,^a but fire does not feed water. It is true that in simple bodies the food and what is fed do seem opposite. But this presents a difficulty ; for some say that like is fed by like, just as like grows by like, but others, as we have said, hold the opposite view, that opposites are fed by their opposites, on the ground that like is unaffected by like, but that food changes and is digested. But all change is to an opposite, or to an

The nature
of food.

^a It was supposed that wood, when perfectly dry, would not keep a fire alight.

ARISTOTLE

416 a

35 κείμενον ἢ τὸ μεταξύ. ἔτι πάσχει τι ἢ τροφή ὑπὸ
 416 b τοῦ τρεφομένου, ἀλλ' οὐ τοῦτο ὑπὸ τῆς τροφῆς,
 ὥσπερ οὐδ' ὁ τέκτων ὑπὸ τῆς ὕλης, ἀλλ' ὑπ' ἐκεί-
 νου αὕτη· ὁ δὲ τέκτων μεταβάλλει μόνον εἰς
 ἐνέργειαν ἐξ ἀργίας.

Πότερον δ' ἐστὶν ἡ τροφή τὸ τελευταῖον προσ-
 γινόμενον ἢ τὸ πρῶτον, ἔχει διαφοράν. εἰ δ'
 5 ἄμφω, ἀλλ' ἡ μὲν ἄπεπτος ἡ δὲ πεπεμμένη,
 ἀμφοτέρως ἂν ἐνδέχοιτο τὴν τροφήν λέγειν· ἡ μὲν
 γὰρ ἄπεπτος, τὸ ἐναντίον τῷ ἐναντίῳ τρέφεται,
 ἡ δὲ πεπεμμένη, τὸ ὅμοιον τῷ ὁμοίῳ. ὥστε
 φανερόν ὅτι λέγουσί τινα τρόπον ἀμφοτέροι καὶ
 ὀρθῶς καὶ οὐκ ὀρθῶς. ἐπεὶ δ' οὐθὲν τρέφεται
 10 μὴ μετέχον ζωῆς, τὸ ἔμψυχον ἂν εἴη σῶμα
 τὸ τρεφόμενον, ἡ ἔμψυχον, ὥστε καὶ ἡ τροφή
 πρὸς ἔμψυχόν ἐστι καὶ οὐ κατὰ συμβεβηκός.
 ἔστι δ' ἕτερον τροφῇ καὶ αὐξητικῶ εἶναι· ἡ μὲν
 γὰρ ποσόν τι τὸ ἔμψυχον, αὐξητικόν, ἡ δὲ τόδε τι
 καὶ οὐσία, τροφή· σώζει γὰρ τὴν οὐσίαν, καὶ
 15 μέχρι τούτου ἐστὶν ἕως ἂν καὶ τρέφηται· καὶ
 γενέσεως ποιητικὸν οὐ τοῦ τρεφομένου, ἀλλ' οἷον
 τὸ τρεφόμενον· ἤδη γάρ ἐστιν αὕτη ἡ οὐσία, γεννᾷ
 δ' οὐθὲν αὐτὸ ἐαυτό, ἀλλὰ σώζει. ὥσθ' ἡ μὲν
 τοιαύτη τῆς ψυχῆς ἀρχὴ δύναμις ἐστὶν οἷα σώζειν
 τὸ ἔχον αὐτὴν ἢ τοιοῦτον, ἡ δὲ τροφή παρασκευάζει
 20 ἐνεργεῖν. διὸ στερηθὲν τροφῆς οὐ δύναται εἶναι.
 ἐπεὶ δ' ἐστὶ τρία, τὸ τρεφόμενον καὶ ᾧ τρέφεται
 καὶ τὸ τρέφον, τὸ μὲν τρέφον ἐστὶν ἡ πρώτη
 92

ON THE SOUL, II. iv.

intermediate state. Again, the food is affected by the fed, and not *vice versa*, just as the carpenter is not affected by his material, but the material by the carpenter ; the carpenter merely changes from idleness to work.

Now it makes a difference whether the food is referred to in its last state or in its first. If in both states, that is both undigested and digested, it would be possible to speak of food in both the ways referred to above ; for when it is undigested, opposite feeds on opposite, but when digested like feeds on like. So that it is clear that both sides argue correctly in one sense and incorrectly in another. But since nothing is nourished which does not share in life, that which has a soul would be the nourished body, in virtue of its having a soul, so that food belongs to that which has a soul and is not an accidental property of it. But nutrition and growth are two different things ; for in so far as that which lives is a quantity, it is a matter of growth, but in so far as it is a particular thing and substance, it is a matter of nourishment ; for that which lives preserves its substance and continues to exist, so long as it is nourished, and it produces the birth not of that which is nourished, but of another like it ; for it is already itself substance, and it does not produce itself in any way, but only preserves itself. So that the first principle of the soul in this respect is its power of preserving what possesses it as an individual, while food prepares it for work. For this reason it cannot continue to exist when deprived of food. But there are three factors in the problem, that which is nourished, that whereby it is nourished, and that which nourishes it. The primary soul is that which

Solution of
the diff-
culty.

16 b

ψυχῇ, τὸ δὲ τρεφόμενον τὸ ἔχον αὐτὴν σῶμα, ᾧ
 δὲ τρέφεται, ἡ τροφή. ἐπεὶ δὲ ἀπὸ τοῦ τέλους
 ἅπαντα προσαγορεύειν δίκαιον, τέλος δὲ τὸ γεννῆσαι
 25 οἶον αὐτό, εἷη ἂν ἡ πρώτη ψυχὴ γεννητικὴ οἶον
 αὐτό. ἔστι δὲ ᾧ τρέφεται διττόν, ὥσπερ καὶ ᾧ
 κυβερνᾷ, ἡ χεὶρ καὶ τὸ πηδάλιον, τὸ μὲν κινεῖν
 καὶ κινούμενον, τὸ δὲ κινεῖν μόνον. πᾶσαν δ'
 ἀναγκαῖον τροφήν δύνασθαι πέττεσθαι, ἐργάζεται
 δὲ τὴν πέψιν τὸ θερμόν· διὸ πᾶν ἔμψυχον ἔχει θερ-
 80 μότητα. τύπῳ μὲν οὖν ἡ τροφή τί ἐστὶν εἴρηται·
 διασαφητέον δ' ἐστὶν ὕστερον περὶ αὐτῆς ἐν τοῖς
 οἰκείοις λόγοις.

V. Διωρισμένων δὲ τούτων λέγωμεν κοινῇ περὶ
 πάσης αἰσθήσεως. ἡ δ' αἴσθησις ἐν τῷ κινεῖσθαι
 τε καὶ πάσχειν συμβαίνει, καθάπερ εἴρηται· δοκεῖ
 85 γὰρ ἀλλοίωσις τις εἶναι. φασὶ δὲ τινες καὶ τὸ
 7 a ὅμοιον ὑπὸ τοῦ ὁμοίου πάσχειν. τοῦτο δὲ πῶς
 δυνατόν ἢ ἀδύνατον, εἰρήκαμεν ἐν τοῖς καθόλου
 λόγοις περὶ τοῦ ποιεῖν καὶ πάσχειν. ἔχει δ'
 ἀπορίαν διὰ τί καὶ τῶν αἰσθήσεων αὐτῶν οὐ
 γίνεται αἴσθησις, καὶ διὰ τί ἄνευ τῶν ἔξω οὐ
 6 ποιοῦσιν αἴσθησιν, ἐνόντος πυρὸς καὶ γῆς καὶ τῶν
 ἄλλων στοιχείων, ὧν ἐστὶν ἡ αἴσθησις καθ' αὐτὰ
 ἢ τὰ συμβεβηκότα τούτοις. δῆλον οὖν ὅτι τὸ
 αἰσθητικὸν οὐκ ἔστιν ἐνεργεία, ἀλλὰ δυνάμει μόνον.
 διὸ καθάπερ τὸ καυστὸν οὐ καίεται αὐτὸ καθ' αὐτὸ
 ἄνευ τοῦ καυστικοῦ· ἔκαιε γὰρ ἂν ἑαυτό, καὶ οὐθὲν
 10 ἐδέειτο τοῦ ἐντελεχείᾳ πυρὸς ὄντος. ἐπειδὴ δὲ τὸ

^a No such treatise has come down to us.

ON THE SOUL. II. iv.—v.

nourishes, that which is nourished is the body which contains the soul, and that whereby it is nourished is the food. But since it is right to name everything in view of its end, and its end is the reproduction of the species, the primary soul would be that which reproduces another like itself. But the words "by which it is nourished" are used in two senses, just like the phrase "by which the helmsman steers," meaning either his hand or the rudder, the latter both moving and being moved, and the former only moving. But all food must be digested, and it is heat which produces digestion; consequently everything possessing a soul has heat. The meaning of food has thus been described in outline; later on we must be more precise about it in a treatise of its own.^a

V. Having completed these definitions let us discuss sensation in general. Sensation consists, as has been said, of being moved and acted upon; for it seems to be some sort of change of state. Now some say that like is only affected by like. But the sense in which this is possible or impossible we have already stated in our general account of acting and being acted upon.^b But a difficulty arises as to why there is no sensation of the senses themselves; that is, why they give no sensation apart from external objects, seeing that fire and earth and the other elements enter into their composition, of which things there is sensation either in themselves, or in their accidental properties. It is clear from this that the faculty of sensation has no actual but only potential existence. So fuel does not burn by itself without something to set fire to it; for otherwise it would burn of itself, and would not need any fire actually at work. But

^a *De Gen. et Corr.* i. 7. 323 b 18 sqq.

417 a

αἰσθάνεσθαι λέγομεν διχῶς (τό τε γὰρ δυνάμει ἀκοῦον καὶ ὁρῶν ἀκούειν καὶ ὁρᾶν λέγομεν, καὶ τύχῃ καθεῦδον, καὶ τὸ ἤδη ἐνεργοῦν), διχῶς ἂν λέγοιτο καὶ ἡ αἴσθησις, ἡ μὲν ὡς δυνάμει, ἡ δὲ ὡς ἐνεργείᾳ. ὁμοίως δὲ καὶ τὸ αἰσθάνεσθαι, τό τε δυνάμει ὄν καὶ τὸ ἐνεργείᾳ.

- 15 Πρῶτον μὲν οὖν ὡς τοῦ αὐτοῦ ὄντος τοῦ πάσχειν καὶ τοῦ κινεῖσθαι καὶ τοῦ ἐνεργεῖν λέγωμεν· καὶ γὰρ ἔστιν ἡ κίνησις ἐνέργειά τις, ἀτελὴς μέντοι, καθάπερ ἐν ἑτέροις εἴρηται. πάντα δὲ πάσχει καὶ κινεῖται ὑπὸ τοῦ ποιητικοῦ καὶ ἐνεργείᾳ ὄντος. διὸ ἔστι μὲν ὡς ὑπὸ τοῦ ὁμοίου πάσχει, ἔστι δὲ
20 ὡς ὑπὸ τοῦ ἀνομοίου, καθάπερ εἶπομεν· πάσχει μὲν γὰρ τὸ ἀνόμοιον, πεπονθὸς δ' ὁμοίον ἔστιν.

- Διαιρετέον δὲ καὶ περὶ δυνάμεως καὶ ἐντελεχείας· νῦν γὰρ ἀπλῶς λέγομεν περὶ αὐτῶν. ἔστι μὲν γὰρ οὕτως ἐπιστήμόν τι ὡς ἂν εἴποιμεν ἄνθρωπον ἐπιστήμονα, ὅτι ὁ ἄνθρωπος τῶν ἐπι-
25 στημόνων καὶ ἐχόντων ἐπιστήμην· ἔστι δ' ὡς ἤδη λέγομεν ἐπιστήμονα τὸν ἔχοντα τὴν γραμματικὴν. ἑκάτερος δὲ τούτων οὐ τὸν αὐτὸν τρόπον δυνατὸς ἔστιν, ἀλλ' ὁ μὲν ὅτι τὸ γένος τοιοῦτον καὶ ἡ ὕλη, ὁ δ' ὅτι βουλευθεὶς δυνατὸς θεωρεῖν, ἂν μὴ τι κωλύσῃ τῶν ἑξῶθεν· ὁ δ' ἤδη θεωρῶν ἐντελεχεῖα
30 ὢν καὶ κυρίως ἐπιστάμενος τόδε τὸ Α. ἀμφοτέροι μὲν οὖν οἱ πρῶτοι κατὰ δύναμιν ἐπιστήμονες, ἀλλ' ὁ μὲν διὰ μαθήσεως ἀλλοιωθεὶς καὶ πολλάκις ἐξ ἐναντίας μεταβαλὼν ἕξεως, ὁ δ' ἐκ τοῦ ἔχειν τὴν

^a e.g. *Phys.* iii. 2, 201 b 31.

ON THE SOUL, II. v.

since we use the term feeling in two senses (for we say that that which has the power of hearing and seeing hears and sees, even if it happens to be asleep, as well as when the faculty is actually operative), so the term sensation must be used in two senses, as potential and as actual. And so feeling means both the faculty and the exercise of it.

To begin with, let us assume that being acted upon and moving is the same thing as exercising the function ; for movement is a form of exercise, though incomplete, as has been said in other treatises.⁴ But everything is acted upon and moved by something which produces an effect and actually exists. Therefore, as we have said, a thing is acted upon both by like and by unlike ; for while it is being acted upon it is unlike, but when the action is complete, it is like.

But we must draw a distinction between potential and actual ; for at present we are speaking of both without discrimination. For knowledge is used in two senses : we might call a man wise because man belongs to the class of those who are wise and have knowledge ; but we may also call the man wise who has a knowledge, say, of grammar. Now each of these two has capacity, but in a different sense : the former, because it is characteristic of his class, and the matter of which he is made ; the latter, because he is capable of thinking whenever he likes, provided that external causes do not prevent him ; but the man who is now thinking is not potential but actual, and really knows something—for instance the letter A. The first two men are both wise only potentially ; the former becomes actually wise only after a change due to instruction, and often from the opposite condition, the latter undergoing change in another sense,

Potential
and actual.

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- 417 b αἰσθησὶν ἢ τὴν γραμματικὴν, μὴ ἐνεργεῖν δ' εἰς τὸ ἐνεργεῖν ἄλλον τρόπον. οὐκ ἔστι δ' ἀπλοῦν οὐδὲ τὸ πάσχειν, ἀλλὰ τὸ μὲν φθορά τις ὑπὸ τοῦ ἐναντίου, τὸ δὲ σωτηρία μᾶλλον τοῦ δυνάμει ὄντος ὑπὸ τοῦ ἐντελεχείᾳ ὄντος καὶ ὁμοίου, οὕτως ὡς
- 5 δύνάμεις ἔχει πρὸς ἐντελέχειαν· θεωροῦν γὰρ γίνεταί τὸ ἔχον τὴν ἐπιστήμην, ὅπερ ἢ οὐκ ἔστιν ἀλλοιοῦσθαι (εἰς αὐτὸ γὰρ ἢ ἐπίδοσις καὶ εἰς ἐντελέχειαν) ἢ ἕτερον γένος ἀλλοιώσεως. διὸ οὐ καλῶς ἔχει λέγειν τὸ φρονοῦν, ὅταν φρονῇ, ἀλλοιοῦσθαι, ὥσπερ οὐδὲ τὸν οἰκοδόμον ὅταν οἰκοδομῇ.
- 10 τὸ μὲν οὖν εἰς ἐντελέχειαν ἄγον ἐκ δυνάμει ὄντος κατὰ τὸ νοῦν καὶ φρονοῦν οὐ διδασκαλίαν ἀλλ' ἐτέραν ἐπωνυμίαν ἔχειν δίκαιον· τὸ δ' ἐκ δυνάμει ὄντος μαρθάνον καὶ λαμβάνον ἐπιστήμην ὑπὸ τοῦ ἐντελεχείᾳ ὄντος καὶ διδασκαλικοῦ ἦτοι οὐδὲ πάσχειν φατέον, ὥσπερ εἴρηται, ἢ δύο τρόπους
- 15 εἶναι ἀλλοιώσεως, τὴν τε ἐπὶ τὰς στερητικὰς διαθέσεις μεταβολὴν καὶ τὴν ἐπὶ τὰς ἕξεις καὶ τὴν φύσιν. τοῦ δ' αἰσθητικοῦ ἢ μὲν πρώτη μεταβολὴ γίνεταί ὑπὸ τοῦ γεννῶντος, ὅταν δὲ γεννηθῇ, ἔχει ἤδη ὥσπερ ἐπιστήμην καὶ τὸ αἰσθάνεσθαι. καὶ τὸ κατ' ἐνέργειαν δὲ ὁμοίως λέγεται τῷ θεωρεῖν.
- 20 διαφέρει δέ, ὅτι τοῦ μὲν τὰ ποιητικὰ τῆς ἐνεργείας ἕξωθεν, τὸ ὁρατὸν καὶ τὸ ἀκουστόν, ὁμοίως δὲ καὶ τὰ λοιπὰ τῶν αἰσθητῶν. αἷτιον δ' ὅτι τῶν καθ' ἕκαστον ἢ κατ' ἐνέργειαν αἰσθησις, ἢ δ'

^a When we see the colour red we see a particular object, which is red, at a particular time. But knowledge of "red" is not knowledge of any red object at any one time but of the colour red detached from such objects, i.e. in A.'s phraseology as "universal."

ON THE SOUL, II. v.

that is, from possessing sensation, or the art of grammar, but not using them, to the exercise of these faculties. But even the term "being acted upon" is not used in a single sense, but sometimes it means a form of decay caused by an opposite, and sometimes rather a preservation of that which is only potential by that which is actual and like itself, in the sense that the potential is related to the actual; for that which has the knowledge becomes a thinking being, which either is not a change of state (for it is only a growth into its real self, that is to actuality), or else is a different kind of change of state. So it is not sound to describe that which thinks as *changing* its state when it thinks, any more than it is true to say that the builder changes his state when he builds. That which produces development from potential to actual in the matter of understanding and thought ought not to be described as teaching, but needs some other name; and that which in a state of potentiality learns, and acquires knowledge from what is actual and educative, either ought not to be called "being acted upon," as has been said, or else there are two kinds of change of state, one a change to a negative condition, and the other a change to a positive condition, that is, a realization of its nature. But in sense-perception the first change is caused by the parent, and when birth is complete the subject has already in a sense knowledge and feeling. We speak just in the same way of actual exercise in the case of thinking; with this difference, that the things which produce the exercise of sensation are objects from outside, the visible and audible, and similarly with all the other objects of sense.^a This is because active feeling is for particular objects, whereas knowledge

417 b

ἐπιστήμη τῶν καθόλου· ταῦτα δ' ἐν αὐτῇ πῶς
 ἐστι τῇ ψυχῇ. διὸ νοῆσαι μὲν ἐπ' αὐτῷ, ὁπόταν
 25 βούληται, αἰσθάνεσθαι δ' οὐκ ἐπ' αὐτῷ· ἀναγκαῖον
 γὰρ ὑπάρχειν τὸ αἰσθητόν. ὁμοίως δὲ τοῦτ' ἔχει
 καὶ ταῖς ἐπιστήμαις ταῖς τῶν αἰσθητῶν, καὶ διὰ
 τὴν αὐτὴν αἰτίαν, ὅτι τὰ αἰσθητὰ τῶν καθ' ἕκαστα
 καὶ τῶν ἔξωθεν.

Ἄλλὰ περὶ μὲν τούτων διασαφῆσαι καιρὸς γένοιτ'
 ἂν καὶ εἰσαῦθις. νῦν δὲ διωρίσθω τοσοῦτον, ὅτι
 80 οὐχ ἄπλοῦ ὄντος τοῦ δυνάμει λεγομένου, ἀλλὰ τοῦ
 μὲν ὥσπερ ἂν εἴποιμεν τὸν παῖδα δύνασθαι στρατη-
 γεῖν, τοῦ δὲ ὡς τὸν ἐν ἡλικίᾳ ὄντα, οὕτως ἔχει τὸ
 418 a αἰσθητικόν. ἐπεὶ δ' ἀνώνυμος αὐτῶν ἡ διαφορά,
 διώρισται δὲ περὶ αὐτῶν ὅτι ἕτερα καὶ πῶς ἕτερα,
 χρῆσθαι ἀναγκαῖον τῷ πάσχειν καὶ ἀλλοιοῦσθαι
 ὡς κυρίοις ὀνόμασιν· τὸ δ' αἰσθητικόν δυνάμει
 ἐστὶν οἷον τὸ αἰσθητὸν ἤδη ἐντελεχεία, καθάπερ
 5 εἴρηται. πάσχει μὲν οὖν οὐχ ὅμοιον ὄν, πεπονθὸς
 δ' ὁμοίωται καὶ ἔστιν οἷον ἐκείνο.

VI. Λεκτέον δὲ καθ' ἑκάστην αἴσθησιν περὶ τῶν
 αἰσθητῶν πρῶτον. λέγεται δὲ τὸ αἰσθητὸν τριχῶς,
 ὧν δύο μὲν καθ' αὐτά φαμεν αἰσθάνεσθαι, τὸ δὲ
 10 ἐν κατὰ συμβεβηκός. τῶν δὲ δύο τὸ μὲν ἴδιόν
 ἐστὶν ἐκάστης αἰσθήσεως, τὸ δὲ κοινὸν πασῶν.
 λέγω δ' ἴδιον μὲν ὃ μὴ ἐνδέχεται ἐτέρᾳ αἰσθήσει
 αἰσθάνεσθαι, καὶ περὶ ὃ μὴ ἐνδέχεται ἀπατηθῆναι,

ON THE SOUL, II. v.—vi.

is of universals ; these in a sense exist in the soul itself. So it lies in man's power to use his mind, whenever he chooses, but it is not in his power to experience sensation ; for the presence of the object felt is essential. The same thing is true of those branches of knowledge, which deal with sensible objects, and, for the same reason, that things are felt among particular and outside objects.

But there will be a later opportunity to clear our impressions about these things. For the moment it will be enough to lay down that the term " potential " Potential as applied to sensation. is used with two meanings ; first as we might say that a boy is a 'potential general, and secondly as we might say it of an adult ; it is only in the latter meaning that the potential applies to that which feels. But since there is no name corresponding to this difference in meaning, and we have now explained that the meanings differ, and how they differ, we must continue to use the words " acted upon " and " change of state " as though they were precise terms ; so that which feels is potentially what the thing felt is actually, as has been said. So long as it is being acted upon it is not like, but, when it has been acted upon, it becomes like, and is even as the object of sense.

VI. We must first of all discuss objects perceived in The objects of sense. relation to each sense. Now the term " object perceived " is used with three meanings ; in two of them we say that we perceive directly, and in one indirectly. Of the first two, one is the particular thing perceived by each sense, and the other is a thing perceived by all the senses. By the particular I mean that which cannot be perceived by any other sense, and concerning which error is impossible, such

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418 a

οἷον ὄψις χρώματος καὶ ἀκοὴ ψόφου καὶ γεῦσις
 χυμοῦ. ἡ δ' ἀφή πλείους μὲν ἔχει διαφοράς· ἀλλ'
 15 ἐκάστη γε κρίνει περὶ τούτων, καὶ οὐκ ἀπατᾶται
 ὅτι χρῶμα οὐδ' ὅτι ψόφος, ἀλλὰ τί τὸ κεχρω-
 σμένον ἢ ποῦ, ἢ τί τὸ ψοφοῦν ἢ ποῦ. τὰ μὲν οὖν
 τοιαῦτα λέγεται ἴδια ἐκάστου, κοινὰ δὲ κίνησις,
 ἡρεμία, ἀριθμός, σχῆμα, μέγεθος· τὰ γὰρ τοιαῦτα
 οὐδεμιᾶς ἐστὶν ἴδια, ἀλλὰ κοινὰ πάσαις· καὶ γὰρ
 20 ἀφ᾽ ἧ κίνησις τίς ἐστὶν αἰσθητὴ καὶ ὄψει. κατὰ
 συμβεβηκὸς δὲ λέγεται αἰσθητόν, οἷον εἰ τὸ λευκὸν
 εἶη Διάρους υἱός· κατὰ συμβεβηκὸς γὰρ τούτου
 αἰσθάνεται, ὅτι τῷ λευκῷ συμβέβηκε τοῦτο οὗ
 αἰσθάνεται. διὸ καὶ οὐδὲν πάσχει ἢ τοιοῦτον ὑπὸ
 τοῦ αἰσθητοῦ. τῶν δὲ καθ' αὐτὰ αἰσθητῶν τὰ
 25 ἴδια κυρίως ἐστὶν αἰσθητά, καὶ πρὸς αὐτὴ οὐσία
 πέφυκεν ἐκάστης αἰσθήσεως.

VII. Οὗ μὲν οὖν ἐστὶν ἡ ὄψις, τοῦτ' ἐστὶν
 ὄρατόν. ὄρατόν δ' ἐστὶν χρῶμά τε, καὶ ὁ λόγῳ
 μὲν ἐστὶν εἰπεῖν, ἀνώνυμον δὲ τυγχάνει ὄν· δῆλον
 δὲ ἔσται ὁ λέγομεν προελθοῦσι μάλιστα. τὸ γὰρ
 ὄρατόν ἐστι χρῶμα. τοῦτο δ' ἐστὶ τὸ ἐπὶ τοῦ
 30 καθ' αὐτὸ ὄρατοῦ· καθ' αὐτὸ δὲ οὐ τῷ λόγῳ, ἀλλ'
 ὅτι ἐν ἑαυτῷ ἔχει τὸ αἴτιον τοῦ εἶναι ὄρατόν. πᾶν
 418 b δὲ χρῶμα κινητικόν ἐστι τοῦ κατ' ἐνέργειαν
 διαφανοῦς, καὶ τοῦτ' ἐστὶν αὐτοῦ ἡ φύσις. διόπερ
 οὐχ ὄρατόν ἄνευ φωτός, ἀλλὰ πᾶν τὸ ἐκάστου
 χρῶμα ἐν φωτὶ ὄρατόν.

ON THE SOUL, II. VI.—VII.

as the seeing of a colour, or the hearing of a sound, or the tasting of a flavour. Touch of course has many varieties of object ; but in these cases a separate sense judges each, nor is it deceived as to that it is a colour or a sound, but only as to where or what the coloured object is, or what and where that is which sounds. All such things belong to each particular sense, but perception of movement, rest, number, shape and size is shared by several senses. For things of this kind are not peculiar to any special sense, but are shared by them all ; for instance, movement is perceived both by touch and by sight. By an object indirectly perceived I mean, for instance, that the white object is the son of Diaretes ; this is an indirect perception, because that which is perceived (the son of Diaretes) only belongs incidentally to the whiteness. For the percipient is not acted upon by the thing perceived (the son of Diaretes) as such. But of things directly perceived the objects of a particular sense are “ perceived ” in the fullest sense, and it is these for which the real nature of each sense exists.

VII. The object of vision is the thing seen. The Vision. thing seen is either colour, or a phenomenon which can be described in words, but has no name of its own ; what we mean by this will become clear when we get further on. The thing seen, then, is colour. And this lies on the surface of the object seen in itself ; by “ in itself ” we mean not that the object is by its definition visible but that it has in itself the reason of its being seen. Every colour can produce movement in the “ transparent ” in a state of activity, and this is its own nature. Therefore nothing is visible without light, but the colour of each individual thing is seen in light.

Διὸ περὶ φωτὸς πρῶτον λεκτέον τί ἐστίν. ἔστι
 δὴ τι διαφανές. διαφανές δὲ λέγω ὃ ἔστι μὲν
 5 ὁρατόν, οὐ καθ' αὐτὸ δὲ ὁρατόν ὡς ἀπλῶς εἰπεῖν,
 ἀλλὰ δι' ἁλλότριον χρῶμα. τοιοῦτον δὲ ἐστίν ἁήρ
 καὶ ὕδωρ καὶ πολλὰ τῶν στερεῶν· οὐ γὰρ ἡ ὕδωρ
 οὐδ' ἡ ἁήρ, διαφανές, ἀλλ' ὅτι ἐστὶ φύσις ἐνυπ-
 άρχουσα ἢ αὐτὴ ἐν τούτοις ἀμφοτέροις καὶ ἐν τῷ
 αἰδίῳ τῷ ἄνω σώματι. φῶς δὲ ἐστίν ἡ τούτου
 10 ἐνέργεια τοῦ διαφανοῦς ἢ διαφανές. δυνάμει δὲ
 ἐν τῷ τοῦτ' ἐστί, καὶ τὸ σκότος. τὸ δὲ φῶς οἶον
 χρῶμά ἐστι τοῦ διαφανοῦς, ὅταν ἡ ἐντελεχεία
 διαφανές ὑπὸ πυρὸς ἢ τοιούτου οἶον τὸ ἄνω σῶμα·
 καὶ γὰρ τούτῳ τι ὑπάρχει ἐν καὶ ταυτόν. τί μὲν
 οὖν τὸ διαφανές καὶ τί τὸ φῶς, εἴρηται, ὅτι οὔτε
 15 πῦρ οὐθ' ὅλως σῶμα οὐδ' ἀπορροή σώματος
 οὐδενός (εἴη γὰρ ἂν σῶμά τι καὶ οὕτως), ἀλλὰ
 πυρὸς ἢ τοιούτου τινὸς παρουσία ἐν τῷ διαφανεῖ·
 οὐδὲ γὰρ δύο σώματα ἅμα δυνατόν ἐν τῷ αὐτῷ
 εἶναι. δοκεῖ δὲ τὸ φῶς ἐναντίον εἶναι τῷ σκότει.
 ἔστι δὲ τὸ σκότος στέρησις τῆς τοιαύτης ἕξεως ἐκ
 20 διαφανοῦς, ὥστε δηλὸν ὅτι καὶ ἡ τούτου παρουσία
 τὸ φῶς ἐστίν. καὶ οὐκ ὀρθῶς Ἐμπεδοκλῆς, οὐδ'
 εἴ τις ἄλλος οὕτως εἴρηκεν, ὡς φερομένου τοῦ
 φωτὸς καὶ γιγνομένου ποτὲ μεταξὺ τῆς γῆς καὶ
 τοῦ περιέχοντος, ἡμᾶς δὲ λανθάνοντος· τοῦτο γὰρ
 ἐστὶ καὶ παρὰ τὴν τοῦ λόγου ἐνάργειαν¹ καὶ παρὰ
 25 τὰ φαινόμενα· ἐν μικρῷ μὲν γὰρ διαστήματι λάθαι
 ἂν, ἀπ' ἀνατολῆς δ' ἐπὶ δυσμᾶς τὸ λανθάνειν μέγα

¹ τὴν ἐν τῷ λόγῳ ἀλήθειαν B.

ON THE SOUL, II. vii.

Consequently we must explain in the first place ^{Light.} what light is. Transparency evidently exists. By transparency I mean that which is seen, but not directly seen without qualification, but as it were owing to a colour from elsewhere. This transparent character is shared by air, water, and many solid objects : it is not transparent because it is water or air, but because the same nature belongs to these two as to the everlasting upper firmament. Now light is the activity of this transparency *qua* transparent. Potentially, wherever it is present, darkness is also present. Light is then in a sense the colour of the transparency, whenever it becomes actually transparent, owing to fire or any such agency as the upper firmament ; for one and the same quality belongs to this also. We have thus described what light and transparency are, that they are neither fire, nor in general any body, nor the emanation from any body (for in that case they would be a body of some kind themselves), but the presence of fire, or something of the kind in the transparency ; for there cannot be two bodies in the same place at the same time. Light is considered to be the opposite of darkness ; but darkness is a removal of an active condition from the transparency, so that obviously light is the presence of such an active transparency. Empedocles, and anyone else who has argued on similar lines, is wrong in saying that light travels, and comes into being between the earth and its envelope, but that we cannot see it : this is contrary both to the *light of reason*, and to *observed facts* ; it would be possible for it to escape our observation in a small intervening space, but for it to do so all the way between east and west makes too big a de-

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118 b

λίαν τὸ αἶττημα. ἔστι δὲ χρώματος μὲν δεκτικὸν
 τὸ ἄχρουν, ψόφου δὲ τὸ ἄψοφον. ἄχρουν δ' ἐστὶ
 τὸ διαφανὲς καὶ τὸ ἀόρατον ἢ τὸ μόλις ὁρώμενον,
 οἷον δοκεῖ τὸ σκοτεινόν. τοιοῦτον δὲ τὸ διαφανὲς
 30 μὲν, ἀλλ' οὐχ ὅταν ἢ ἐντελεχεῖα διαφανές, ἀλλ'
 ὅταν δυνάμει· ἢ γὰρ αὐτὴ φύσις ὅτε μὲν σκότος
 419 a ὅτε δὲ φῶς ἐστίν. οὐ πάντα δὲ ὁρατὰ ἐν φωτὶ
 ἐστίν, ἀλλὰ μόνον ἐκάστου τὸ οἰκεῖον χρῶμα·
 ἓν γὰρ ἐν μὲν τῷ φωτὶ οὐχ ὁράται, ἐν δὲ τῷ
 σκότει ποιεῖ αἴσθησιν, οἷον τὰ πυρώδη φαινόμενα
 καὶ λάμποντα (ἀνώνυμα δ' ἐστὶ ταῦτα ἐνὶ ὀνόματι),
 5 οἷον μύκης, κέρας, κεφαλαὶ ἰχθύων καὶ λεπίδες καὶ
 ὀφθαλμοί· ἀλλ' οὐδενὸς ὁράται τούτων τὸ οἰκεῖον
 χρῶμα. δι' ἣν μὲν οὖν αἰτίαν ταῦτα ὁράται, ἄλλος
 λόγος· νῦν δ' ἐπὶ τοσοῦτον φανερόν ἐστιν, ὅτι τὸ
 μὲν ἐν φωτὶ ὁρώμενον χρῶμα. διὸ καὶ οὐχ ὁράται
 10 ἄνευ φωτός· τοῦτο γὰρ ἦν αὐτῷ τὸ χρῶματι εἶναι
 τὸ κινητικῷ εἶναι τοῦ κατ' ἐνέργειαν διαφανοῦς·
 ἢ δ' ἐντελέχεια τοῦ διαφανοῦς φῶς ἐστίν. σημεῖον
 δὲ τούτου φανερόν· εἰ γὰρ τις θῇ τὸ ἔχον χρῶμα
 ἐπ' αὐτὴν τὴν ὄψιν, οὐκ ὄψεται· ἀλλὰ τὸ μὲν
 χρῶμα κινεῖ τὸ διαφανές, οἷον τὸν αέρα, ὑπὸ
 15 τούτου δὲ συνεχοῦς ὄντος κινεῖται τὸ αἰσθητήριον.
 οὐ γὰρ καλῶς τοῦτο λέγει Δημόκριτος οἰόμενος,
 εἰ γένοιτο κενὸν τὸ μεταξύ, ὁρᾶσθαι ἂν ἀκριβῶς
 καὶ εἰ μύρμηξ ἐν τῷ οὐρανῷ εἴη· τοῦτο γὰρ
 ἀδύνατόν ἐστιν. πάσχοντος γὰρ τι τοῦ αἰσθητικοῦ
 γίνεται τὸ ὁρᾶν· ὑπ' αὐτοῦ μὲν οὖν τοῦ ὁρωμένου
 20 χρώματος ἀδύνατον, λείπεται δὲ ὑπὸ τοῦ μεταξύ,
 ὥστ' ἀναγκαῖόν τι εἶναι μεταξύ· κενοῦ δὲ γενο-
 μένου οὐχ ὅτι ἀκριβῶς, ἀλλ' ὅλως οὐθὲν ὀφθῆσεται.

ON THE SOUL, II. VII.

mand on our credulity. The colourless is receptive of colour, as the soundless of sound. Transparency, and what is unseen or only just seen, are colourless, just as darkness is admitted to be. This, then, is the nature of the transparency, not when it exists actually, but when it is only potential : for its nature is the same both when there is darkness and when there is light. But not everything is visible in the light, but only the particular colour of each individual thing ; for some things are not seen in the light, but only produce sensation in the dark, such as those which appear fiery or luminous (there is no single name for these two), like fungi, horn, the heads, scales, and eyes of certain fishes ; but in none of these is a particular colour seen ; why such things are visible is another question ; but at this point it is clear that what is visible in light is colour. So it is not seen without light ; for the essential nature of colour is its capacity to produce movement in the transparency, when it is active ; and the actuality of the transparency is light. The evidence for this is clear ; for if one puts that which has colour close up to the eye, it will not be visible ; but colour moves the transparency, for instance the air, and the sense organ is moved by this provided that it is continuous. Democritus is mistaken in thinking that if the medium were empty, even an ant in the sky would be clearly visible ; for this is impossible. For vision occurs when the sensitive faculty is acted upon ; as it cannot be acted upon by the actual colour which is seen, there only remains the medium to act on it, so that some medium must exist ; in fact, if the intervening space were void, not merely would accurate vision be impossible, but nothing would be seen at all. We have then

The medium
of vision.

ARISTOTLE

^{19 a} δι' ἣν μὲν οὖν αἰτίαν τὸ χρῶμα ἀναγκαῖον ἐν φωτὶ
ὁρᾶσθαι, εἴρηται. πῦρ δὲ ἐν ἀμφοῖν ὁράται, καὶ
ἐν σκότει καὶ ἐν φωτί, καὶ τοῦτο ἐξ ἀνάγκης· τὸ
²⁵ γὰρ διαφανὲς ὑπὸ τούτου γίνεται διαφανές.

Ὁ δ' αὐτὸς λόγος καὶ περὶ ψόφου καὶ ὁσμῆς
ἐστίν· οὐθὲν γὰρ αὐτῶν ἀπτόμενον τοῦ αἰσθητηρίου
ποιεῖ τὴν αἴσθησιν, ἀλλ' ὑπὸ μὲν ὁσμῆς καὶ ψόφου
τὸ μεταξὺ κινεῖται, ὑπὸ δὲ τούτου τῶν αἰσθητηρίων
³⁰ ἐκάτερον· ὅταν δ' ἐπ' αὐτό τις ἐπιθῇ τὸ αἰσθη-
τήριον τὸ ψοφοῦν ἢ τὸ ὄζον, οὐδεμίαν αἴσθησιν
ποιήσῃ. περὶ δὲ ἀφῆς καὶ γεύσεως ἔχει μὲν
ὁμοίως, οὐ φαίνεται δέ· δι' ἣν δ' αἰτίαν, ὕστερον
ἔσται δῆλον. τὸ δὲ μεταξὺ ψόφων μὲν ἀήρ, ὁσμῆς
δ' ἀνώνυμον· κοινὸν γὰρ δὴ τι πάθος ἐπ' ἀέρος
καὶ ὕδατός ἐστιν, ὥσπερ τὸ διαφανὲς χρώματι,
³⁵ οὕτω τῷ ἔχοντι ὁσμὴν ὃ ἐν ἀμφοτέροις ὑπάρχει
τούτοις· φαίνεται γὰρ καὶ τὰ ἐνυδρα τῶν ζώων
^{19 b} ἔχειν αἴσθησιν ὁσμῆς. ἀλλ' ὁ μὲν ἄνθρωπος καὶ
τῶν πεζῶν ὅσα ἀναπνεῖ, ἀδυνατεῖ ὁσμᾶσθαι μὴ
ἀναπνέοντα. ἢ δ' αἰτία καὶ περὶ τούτων ὕστερον
λεχθήσεται.

VIII. Νῦν δὲ πρῶτον περὶ ψόφου καὶ ἀκοῆς
⁵ διορίσωμεν. ἔστι δὲ διττός ὁ ψόφος· ὁ μὲν γὰρ
ἐνέργειά τις, ὁ δὲ δύναμις· τὰ μὲν γὰρ οὐ φαμεν
ἔχειν ψόφον, οἶον σπόγγον, ἔρια, τὰ δ' ἔχειν, οἶον
χαλκὸν καὶ ὅσα στερεὰ καὶ λεῖα, ὅτι δύναται
ψοφῆσαι. τοῦτο δ' ἐστὶν αὐτοῦ μεταξὺ καὶ τῆς

^a 422 b 34 sqq.

^b Fishes have certain olfactory apparatus, but it is very doubtful whether they have a sense of smell.

^c 421 b 13 to 422 a 6.

^d There seems to be little point in this distinction, nor does

ON THE SOUL, II. VII.—VIII.

explained why colour can only be seen in the light. Now fire is visible both in darkness and light, and this is necessarily so ; for the transparency becomes transparent because of the fire.

The same theory applies both to sound and smell ; neither of these provokes sensation because it touches the sense organ, but movement is produced in the medium by scent and sound, and each of the sense organs is stimulated by the medium ; but, when one puts either the sound or the scent close up to the sense organ, no sensation is produced. The same thing is true of touch and taste, but it is not so obvious ; why this is so will become clear later on.^a The medium in the case of sound is air, but in the case of smell has no name ; for air and water have certainly a common characteristic, which is present in both of them, and bears the same relation to that which emits smell as the transparency does to colour ; for even animals which live under water seem to have the sense of smell.^b But man, and all the land animals which breathe, cannot smell except when they are breathing. The reason for this will be discussed later.^c

VIII. Now we must state our definitions of sound and hearing. Sound has two meanings ; sometimes it is actual, sometimes potential ;^d for we say that some things have no sound, such as a sponge or wool, but that others have, such as bronze, and all things which are both solid and smooth, because they can give forth sound. That is to say, they are the cause of sound being actually produced between the object

A medium is also necessary for sound and scent.

The conditions in which sound is heard.

A. make any use of it. What he means is that bronze has "potential" sound because sound can be produced from it, whereas from wool no sound can be produced.

419 b

ἀκοῆς ἐμποιῆσαι ψόφον ἐνεργεία. γίνεται δ' ὁ
 10 κατ' ἐνέργειαν ψόφος αἰεί τινος πρὸς τι καὶ ἐν
 τινι· πληγὴ γάρ ἐστιν ἡ ποιοῦσα. διὸ καὶ ἀδύνατον
 ἐνὸς ὄντος γενέσθαι ψόφον· ἕτερον γὰρ τὸ τύπτον
 καὶ τὸ τυπτόμενον· ὥστε τὸ ψοφοῦν πρὸς τι
 ψοφεῖ. πληγὴ δ' οὐ γίνεται ἄνευ φορᾶς. ὥσπερ
 δ' εἴπομεν, οὐ τῶν τυχόντων πληγὴ ὁ ψόφος·
 15 οὐθένα γὰρ ποιεῖ ψόφον ἔρια ἂν πληγῇ, ἀλλὰ
 χαλκὸς καὶ ὅσα λεία καὶ κοῖλα, ὁ μὲν χαλκός, ὅτι
 λείος· τὰ δὲ κοῖλα τῇ ἀνακλάσει πολλὰς ποιεῖ
 πληγὰς μετὰ τὴν πρώτην, ἀδυνατοῦντος ἐξελθεῖν
 τοῦ κινηθέντος. ἔτι ἀκούεται ἐν αἱρί καὶ ὕδατι,
 ἀλλ' ἦττον. οὐκ ἔστι δὲ ψόφου κύριος ὁ ἀήρ οὐδὲ
 20 τὸ ὕδωρ· ἀλλὰ δεῖ στερεῶν πληγὴν γενέσθαι πρὸς
 ἄλληλα καὶ πρὸς τὸν αἶρα. τοῦτο δὲ γίνεται,
 ὅταν ὑπομένῃ πληγεῖς ὁ ἀήρ καὶ μὴ διαχυθῇ.
 διὸ ἐὰν ταχέως καὶ σφοδρῶς πληγῇ, ψοφεῖ· δεῖ
 γὰρ φθάσαι τὴν κίνησιν τοῦ ῥαπίζοντος τὴν
 θρύψιν τοῦ αἱρος, ὥσπερ ἂν εἰ σωρόν ἢ ὄρμαθόν
 25 ψάμμου τύπτοι τις φερόμενον ταχύ.

Ἡχὼ δὲ γίνεται, ὅταν ἀπὸ τοῦ αἱρος ἐνός
 γενομένου διὰ τὸ ἀγγεῖον τὸ διορίσαν καὶ κωλύσαν
 θρυφθῆναι πάλιν ὁ ἀήρ ἀπωσθῇ, ὥσπερ σφαῖρα.
 ἔοικε δ' αἰεί γίνεσθαι ἡχώ, ἀλλ' οὐ σαφές, ἐπεὶ
 συμβαίνει γε ἐπὶ τοῦ ψόφου καθάπερ καὶ ἐπὶ τοῦ
 30 φωτός· καὶ γὰρ τὸ φῶς αἰεί ἀνακλᾶται (οὐδὲ γὰρ
 ἂν ἐγένετο πάντῃ φῶς, ἀλλὰ σκότος ἔξω τοῦ ἡλίου-

ON THE SOUL, II. viii.

itself and the sense of hearing. But the sound actually produced is of something striking against something else in a medium ; for that which produces the sound is a blow. So if there is only one condition present there can be no sound ; for the striker and the thing struck are two different things ; so that what produces the sound sounds against something else. But no blow occurs without movement. But, as we have said, sound is not caused by a blow upon any chance thing ; for wool produces no sound even if it is struck, but bronze and things which are hollow and smooth do ; bronze because it is smooth, and hollow things after the original blow produce a number of other sounds by reverberation, because that which is moved (*i.e.* the medium) cannot escape. Sound is heard also in water as well as in air, but less loudly. But neither the air nor the water is responsible for the sound ; but there must be a striking of solid objects against each other, and against the air. This occurs when the air remains in its place when struck, and is not dispersed. If then it is struck sharply and violently there is a sound ; for it is necessary that the movement of the striker should forestall the escape of air, just as it would be if one were to strike a heap of sand or a revolving sandstorm moving rapidly.

Echo occurs when air rebounds from air, which is ^{Echo.} continuous, because of the vessel which confines it, and prevents it from escaping, like a bouncing ball. It seems likely that there is always an echo, but it is not always noticeable, since the same thing happens with sound as with light ; for light is always reflected (otherwise there would not be light everywhere, but there would be darkness in every region outside that

419 b

μένου), ἀλλ' οὐχ οὕτως ἀνακλᾶται ὥσπερ ἀφ' ὕδατος ἢ χαλκοῦ ἢ καὶ τινος ἄλλου τῶν λείων, ὥστε σκιὰν ποιεῖν, ἢ τὸ φῶς ὀρίζομεν. τὸ δὲ κενὸν ὀρθῶς λέγεται κύριον τοῦ ἀκούειν. δοκεῖ γὰρ εἶναι κενὸν ὁ ἀήρ, οὗτος δ' ἐστὶν ὁ ποιῶν
 85 ἀκούειν, ὅταν κινηθῇ συνεχῆς καὶ εἰς. ἀλλὰ διὰ
 420 a τὸ ψαθυρὸς εἶναι οὐ γεγωνεῖ, ἀν¹ μὴ λείον ἢ τὸ πληγέν. τότε δὲ εἰς γίνεται ἅμα διὰ τὸ ἐπίπεδον· ἐν γὰρ τὸ τοῦ λείου ἐπίπεδον.

Ψοφητικὸν μὲν οὖν τὸ κινητικὸν ἐνὸς ἀέρος συνεχεία μέχρις ἀκοῆς, ἀκοὴ δὲ συμφυῆς ἀέρι.
 5 διὰ δὲ τὸ ἐν ἀέρι εἶναι, κινουμένου τοῦ ἔξω τὸ εἴσω κινεῖται.² διόπερ οὐ πάντῃ τὸ ζῶον ἀκούει, οὐδὲ πάντῃ διέρχεται ὁ ἀήρ· οὐ γὰρ πάντῃ ἔχει ἀέρα τὸ κινήσμενον μέρος καὶ ἔμψυχον. αὐτὸ μὲν δὴ ἄψοφον ὁ ἀήρ διὰ τὸ εὐθρυπτον· ὅταν δὲ κωλυθῇ θρύπτεσθαι, ἢ τούτου κίνησις ψόφος. ὁ
 10 δ' ἐν τοῖς ὡσὶν ἐγκατωκοδόμηται πρὸς τὸ ἀκίνητος εἶναι, ὅπως ἀκριβῶς αἰσθάνηται πάσας τὰς διαφοράς τῆς κινήσεως. διὰ ταῦτα δὲ καὶ ἐν-ὑδατι ἀκούομεν, ὅτι οὐκ εἰσέρχεται πρὸς αὐτὸν τὸν συμφυῆ ἀέρα· ἀλλ' οὐδ' εἰς τὸ οὖς διὰ τὰς ἑλικας. ὅταν δὲ τοῦτο συμβῇ, οὐκ ἀκούει· οὐδ' ἂν ἢ
 15 μῆνιγξ κάμη, ὥσπερ τὸ ἐπὶ τῇ κόρῃ δέρμα ὅταν κάμη. ἀλλὰ καὶ σημεῖον τοῦ ἀκούειν ἢ μὴ τὸ

¹ ὡν B.² κινεῖ B.

ON THE SOUL, II. VIII.

directly illuminated by the sun), but it is not always reflected in such a way as to cause a shadow, by which the light is defined, as it is by water or bronze, or any other smooth surface. But the empty space is rightly described as the essential condition of hearing. For the air is thought to be empty, and it is this which causes hearing when it is moved and continuous. But the sound is not recognized unless the object struck is smooth, because the air is apt to be broken up. But if the object struck is smooth then the air is continuous because of the surface ; for the surface of what is smooth is continuous.

That, then, which can produce movement in continuous air, which remains continuous until it reaches the hearing, is sound-producing, and the air is connected by nature with the organ of hearing. But since this organ of hearing is in the air, when what is outside is moved, what is inside moves too. So that the animal does not hear with every part of it, nor does the air penetrate everywhere ; for the part which will be affected, that is the living animal, has not air everywhere. The air itself is incapable of sound, because it is easily thrust aside ; but when there is something to prevent its being thrust aside, its movement becomes sound. But the air in the ears is lodged deep, so as to be unmoved, in order that it may accurately perceive all differences of motion. That is why we can hear even in water, for the water does not enter as far as the air which belongs to the ear ; and it does not do so because of the spirals of which the ear is formed. When this does occur, there is no hearing ; nor again if the membrane is damaged, just as when the membrane over the eye is damaged. A proof of our hearing or not is the continual ringing

*The process
of hearing.*

420 a

ἡχεῖν αἰεὶ τὸ οὖς ὥσπερ τὸ κέρας· αἰεὶ γὰρ οὐκείαν
τινὰ κίνησιν ὁ ἀῆρ κινεῖται ὁ ἐν τοῖς ὠσίν· ἀλλ' ὁ
ψόφος ἀλλότριος καὶ οὐκ ἴδιος. καὶ διὰ τοῦτό
φασιν ἀκούειν τῷ κενῷ καὶ ἡχοῦντι, ὅτι ἀκούομεν

20 τῷ ἔχοντι ὠρισμένον τὸν ἀέρα. πότερον δὲ ψο-
φεῖ τὸ τυπτόμενον ἢ τὸ τύπτον; ἢ καὶ ἄμφω,
τρόπον δ' ἕτερον· ἔστι γὰρ ὁ ψόφος κίνησις τοῦ
δυναμένου κινεῖσθαι τὸν τρόπον τοῦτον ὥνπερ τὰ
ἀφαλλόμενα ἀπὸ τῶν λείων, ὅταν τις κρούσῃ. οὐ
δὴ πᾶν, ὥσπερ εἴρηται, ψοφεῖ τυπτόμενον καὶ

25 τύπτον, οἷον ἐὰν πατάξῃ βελόνῃ βελόνῃν· ἀλλὰ
δεῖ τὸ τυπτόμενον ὁμαλὸν εἶναι, ὥστε τὸν ἀέρα
ἄθροῦν ἀφάλλεσθαι καὶ σείεσθαι. αἱ δὲ διαφοραὶ
τῶν ψοφούντων ἐν τῷ κατ' ἐνέργειαν ψόφῳ
δηλοῦνται· ὥσπερ γὰρ ἄνευ φωτὸς οὐχ ὁράται τὰ
χρώματα, οὕτως οὐδ' ἄνευ ψόφου τὸ ὀξύ καὶ τὸ
βαρὺ. ταῦτα δὲ λέγεται κατὰ μεταφορὰν ἀπὸ

80 τῶν ἀπτῶν· τὸ μὲν γὰρ ὀξύ κινεῖ τὴν αἴσθησιν ἐν
ὀλίγῳ χρόνῳ ἐπὶ πολὺ, τὸ δὲ βαρὺ ἐν πολλῷ ἐπ'
ὀλίγον. οὐ δὴ ταχὺ τὸ ὀξύ, τὸ δὲ βαρὺ βραδύ,
ἀλλὰ γίνεται τοῦ μὲν διὰ τὸ τάχος ἢ κίνησις

420 b τοιαύτη, τοῦ δὲ διὰ βραδυτήτα. καὶ ἔοικεν ἀνά-
λογον ἔχειν τῷ περὶ τὴν ἀφήν ὀξεῖ καὶ ἀμβλεῖ·
τὸ μὲν γὰρ ὀξύ οἷον κεντεῖ, τὸ δ' ἀμβλὺ οἷον
ὠθεῖ διὰ τὸ κινεῖν, τὸ μὲν ἐν ὀλίγῳ, τὸ δὲ ἐν
πολλῷ, ὥστε συμβαίνει τὸ μὲν ταχὺ τὸ δὲ βραδὺ
5 εἶναι. περὶ μὲν οὖν ψόφου ταύτη διωρίσθω.

Ἡ δὲ φωνὴ ψόφος τίς ἐστιν ἐμφύχων· τῶν γὰρ
ἀψύχων οὐθὲν φωνεῖ, ἀλλὰ καθ' ὁμοιότητα λέγεται

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in the ear like a horn ; for the air in the ear always moves with a special movement of its own ; but sound is from an outside source, and not a property of the ear. This is why they say that we hear by something which is empty and resonant, because we hear by that which has the air enclosed in it. Now which of the two sounds—the struck or the striker ? Perhaps both but in a different sense ; for sound is the movement of what can be moved, in the same way as things leap off a smooth surface when one strikes it. But, as has been said, not everything struck and striking produces a sound, as, for instance, if one strikes a needle with a needle ; but that which is struck must be flat, so that the air compacted may rebound and vibrate. But the differences in things which sound are shown in sound actually realized ; for just as colours cannot be seen in the absence of light, so high and low pitch cannot be detected in the absence of sound. These terms are used by analogy from the sense of touch. The high pitch produces sensation by penetrating a long way in a short time, the low pitch penetrates a little way in a long time. It is not that the high pitch is itself quick, while the low pitch is slow, but the movement of the former becomes what it is because of its quickness, and the latter because of its slowness. It seems to be analogous to the sharp and blunt in the matter of touch ; for the sharp stabs, so to speak, but the blunt pushes its way in by its movement ; the former in a short time, the latter in a long time, so that the one is swift and the other slow. This is a sufficient account of sound.

But voice is the sound produced by a creature pos- ^{Voice.}
sessing a soul ; for none of the soulless creatures has

420 b

φωνεῖν, οἷον αὐλὸς καὶ λύρα καὶ ὅσα ἄλλα τῶν
 ἀψύχων ἀπότασιν ἔχει καὶ μέλος καὶ διάλεκτον.
 ἔοικε γὰρ ὅτι καὶ ἡ φωνὴ ταύτ' ἔχει, πολλὰ δὲ
 10 τῶν ζώων οὐκ ἔχουσι φωνήν, οἷον τὰ τε ἄναιμα
 καὶ τῶν ἐναίμων ἰχθύες. καὶ τοῦτ' εὐλόγως, εἴπερ
 αἶρος κίνησις τίς ἐστίν ὁ ψόφος. ἀλλ' οἱ λεγό-
 μενοι φωνεῖν, οἷον ἐν τῷ Ἀχελώῳ, ψοφοῦσι τοῖς
 βραγχίοις ἢ τινι ἑτέρῳ τοιούτῳ. φωνὴ δ' ἐστὶ
 ζώου ψόφος, καὶ οὐ τῷ τυχόντι μορίῳ. ἀλλ' ἐπεὶ
 15 πᾶν ψοφεῖ τύπτοντός τινος καὶ τι καὶ ἐν τινι,
 τοῦτο δ' ἐστὶν ἀήρ, εὐλόγως ἂν φωνοίῃ ταῦτα
 μόνα ὅσα δέχεται τὸν αἶρα. ἤδη γὰρ τῷ ἀναπνεο-
 μένῳ καταχρῆται ἡ φύσις ἐπὶ δύο ἔργα, καθάπερ
 τῇ γλώττῃ ἐπὶ τε τὴν γεῦσιν καὶ τὴν διάλεκτον,
 ὧν ἡ μὲν γεῦσις ἀναγκαῖον (διὸ καὶ πλείοσιν
 20 ὑπάρχει), ἡ δ' ἐρμηνεία ἔνεκα τοῦ εὖ, οὕτω καὶ
 τῷ πνεύματι πρὸς τε τὴν θερμότητα τὴν ἐντὸς
 ὥς ἀναγκαῖον (τὸ δ' αἷτιον ἐν ἑτέροις εἰρήσεται)
 καὶ πρὸς τὴν φωνήν, ὅπως ὑπάρχη τὸ εὖ. ὄργα-
 νον δὲ τῇ ἀναπνοῇ ὁ φάρυγξ· οὗ δ' ἔνεκα καὶ τὸ
 μόριόν ἐστι τοῦτο, πλεύμων· τούτῳ γὰρ τῷ μορίῳ
 25 πλείστον ἔχει τὸ θερμὸν τὰ περὶ τῶν ἄλλων.
 δεῖται δὲ τῆς ἀναπνοῆς καὶ ὁ περὶ τὴν καρδίαν
 τόπος πρῶτος. διὸ ἀναγκαῖον εἶσω ἀναπνεομένου
 εἰσιέναι τὸν αἶρα. ὥστε ἡ πληγὴ τοῦ ἀναπνεομένου
 αἶρος ὑπὸ τῆς ἐν τούτοις τοῖς μορίοις ψυχῆς πρὸς

^a *Hist. Anim.* iv. 9, 535 b 14 "the boar in the Achelous."
 A cat-fish has been found in the Achelous of which this is true.

^b *Cf. De Resp.* ch. viii.

ON THE SOUL, II. viii.

a voice ; they can only be said to give tongue metaphorically, as for instance a flute or a lyre, and all the other soulless things, which have a musical compass, and tune, and articulation ; it seems that the voice has these things, but many animals have no voice, such as all the bloodless animals, and the fishes among the animals with blood. And this is quite reasonable, since sound is due to a movement of the air. But those creatures which are said to have a voice, such as those in the *Achelous*,^a only make a sound with their gills, or with some other part of them. Voice, then, is a sound made by a living animal, and even then not with any part of it taken at random. But, since sound only occurs when something strikes something else in a certain medium, and this medium is the air, it is natural that only those things should have voice which admit the air. Nature makes use of the constant supply of air breathed in for two functions, just as she uses the tongue both for taste and for articulate speech, of which taste is an essential to life (and consequently belongs to more species), and the power of interpretation is for the sake of living well ; so in the same way she employs breath both to conserve internal heat, which is an essential (the reason for this will be explained in another treatise),^b and also for the voice, that well-being may be possible. The throat is the instrument of respiration ; the reason for which this part exists is the lung ; it is because of this part that the land animals have more heat than the rest ; and the region about the heart is the first to need this breathing. So it is necessary that during respiration the air should be breathed in. So the blow given to the air breathed in by the soul in these parts against

420 b

τὴν καλουμένην ἀρτηρίαν φωνή ἐστιν. οὐ γὰρ πᾶς
 80 ζῶον ψόφος φωνή, καθάπερ εἵπομεν (ἐστὶ γὰρ
 καὶ τῇ γλώττῃ ψοφεῖν καὶ ὡς οἱ βήττοντες), ἀλλὰ
 δεῖ ἔμψυχόν τε εἶναι τὸ τύπτον καὶ μετὰ φαντασίας
 τινός· σημαντικὸς γὰρ δὴ τις ψόφος ἐστὶν ἢ
 φωνή, καὶ οὐ τοῦ ἀναπνεομένου ἀέρος, ὥσπερ ἢ
 421 a βήξ· ἀλλὰ τούτῳ τύπτει τὸν ἐν τῇ ἀρτηρίᾳ πρὸς
 αὐτήν. σημεῖον δὲ τὸ μὴ δύνασθαι φωνεῖν ἀνα-
 πνέοντα μὴδ' ἐκπνέοντα, ἀλλὰ κατέχοντα· κινεῖ
 γὰρ τοῦτο ὁ κατέχων. φανερόν δὲ καὶ διότι οἱ
 ἰχθύες ἄφωνοι· οὐ γὰρ ἔχουσι φάρυγγα. τοῦτο
 5 δὲ τὸ μόριον οὐκ ἔχουσιν, ὅτι οὐ δέχονται τὸν
 ἀέρα οὐδ' ἀναπνέουσιν. δι' ἣν μὲν οὖν αἰτίαν,
 ἕτερός ἐστι λόγος.

IX. Περὶ δὲ ὁσμῆς καὶ ὁσφραντοῦ ἦττον εὐ-
 διόριστόν ἐστι τῶν εἰρημένων· οὐ γὰρ δῆλον ποῖόν
 τί ἐστιν ἢ ὁσμή, οὕτως ὡς ὁ ψόφος ἢ τὸ χρῶμα.
 10 αἴτιον δ' ὅτι τὴν αἴσθησιν ταύτην οὐκ ἔχομεν
 ἀκριβῆ, ἀλλὰ χεῖρω πολλῶν ζώων· φαύλως γὰρ
 ἄνθρωπος ὁσμάται, καὶ οὐθενὸς αἰσθάνεται τῶν
 ὁσφραντῶν ἄνευ τοῦ λυπηροῦ ἢ τοῦ ἡδέος, ὡς
 οὐκ ὄντος ἀκριβοῦς τοῦ αἰσθητηρίου. εὐλογον δ'
 οὕτω καὶ τὰ σκληρόφθαλμα τῶν χρωμάτων αἰσθά-
 νεσθαι, καὶ μὴ διαδήλους αὐτοῖς εἶναι τὰς δια-
 15 φορὰς τῶν χρωμάτων πλὴν τῷ φοβερῷ καὶ ἀφόβῳ.
 οὕτω δὲ καὶ τὰς ὁσμάς τὸ τῶν ἀνθρώπων γένος·
 ἔοικε μὲν γὰρ ἀνάλογον ἔχειν πρὸς τὴν γεῦσιν καὶ
 ὁμοίως τὰ εἶδη τῶν χυμῶν τοῖς τῆς ὁσμῆς, ἀλλ'
 ἀκριβεστέραν ἔχομεν τὴν γεῦσιν διὰ τὸ εἶναι αὐτήν

^a Cf. *Part. Anim.* 669 a 2.

ON THE SOUL, II. VIII.—IX.

what is called the windpipe causes the voice. For not every sound made by a living creature is a voice, as we have said (for even those who cough are making a sound with their tongue), but that which strikes must possess a soul, and have some mental picture ; for the voice is a sound which means something, and is not merely indicative of air inhaled, as a cough is ; in this case one strikes the air in the windpipe against the windpipe itself. Proof of this lies in the fact that it is impossible to speak either when inhaling or exhaling, but only when holding the breath : for he that is holding his breath causes the movement by his breath. It is clear, then, why fishes are dumb ; it is because they have no throat. They have not this organ because they neither admit air nor exhale it. The reason for this is a different question.^a

IX. Concerning sense of smell and objects smelt, ^{Smell.} it is less easy to give a precise account than in the subjects we have already discussed. For the character of smell is not so obvious as that of sound and colour. The reason is that this sense with us is not highly discriminating, far less so indeed than with many animals ; for man's sense of smell is inferior, and it is also incapable of apprehending the object smelt without a consciousness that it is either pleasant or unpleasant, and this is because the sense organ is not discriminating. It is natural that the hard-eyed animals should perceive colours in a similar way, and that they should not be capable of distinguishing colours except as to be feared or the reverse. The human race is in the same position towards smells ; there would seem to be some analogy between taste and the different kinds of flavours on the one hand, and the objects of smell on the other, but taste is

421 a

20 ἀφὴν τινα, ταύτην δ' ἔχειν τὴν αἴσθησιν τὸν
 ἄνθρωπον ἀκριβεστάτην· ἐν μὲν γὰρ ταῖς ἄλλαις
 λείπεται πολλῶ τῶν ζώων, κατὰ δὲ τὴν ἀφὴν
 πολλῶν τῶν ἄλλων διαφερόντως ἀκριβοῖ. διὸ καὶ
 φρονιμώτατόν ἐστι τῶν ζώων. σημείον δὲ τὸ καὶ
 ἐν τῷ γένει τῶν ἀνθρώπων παρὰ τὸ αἰσθητήριον
 25 τοῦτο εἶναι εὐφυεῖς καὶ ἀφυεῖς, παρ' ἄλλο δὲ
 μῆδέν· οἱ μὲν γὰρ σκληρόσαρκοι ἀφυεῖς τὴν
 διάνοιαν, οἱ δὲ μαλακόσαρκοι εὐφυεῖς. ἔστι δ',
 ὥσπερ χυμὸς ὁ μὲν γλυκὺς ὁ δὲ πικρὸς, οὕτω
 καὶ ὁσμάι. ἀλλὰ τὰ μὲν ἔχουσι τὴν ἀνάλογον
 ὁσμὴν καὶ χυμόν (λέγω δὲ οἶον γλυκεῖαν ὁσμὴν
 καὶ γλυκὺν χυμόν), τὰ δὲ τούναντίον. ὁμοίως δὲ
 80 καὶ δριμεῖα καὶ αὐστηρὰ καὶ ὀξεῖα καὶ λιπαρὰ
 ἐστὶν ὁσμὴ.

Ἄλλ' ὥσπερ εἵπομεν, διὰ τὸ μὴ σφόδρα δια-
 δήλους εἶναι τὰς ὁσμὰς ὥσπερ τοὺς χυμούς, ἀπὸ
 421 b τούτων εἴληφε τὰ ὀνόματα καθ' ὁμοιότητα τῶν
 πραγμάτων· ἡ μὲν γὰρ γλυκεῖα ἀπὸ τοῦ κρόκου
 καὶ τοῦ μέλιτος, ἡ δὲ δριμεῖα θύμου καὶ τῶν
 τοιούτων· τὸν αὐτὸν δὲ τρόπον καὶ ἐπὶ τῶν ἄλλων.
 ἔστι δ' ὥσπερ ἡ ἀκοὴ καὶ ἐκάστη τῶν αἰσθήσεων,
 5 ἡ μὲν τοῦ ἀκουστοῦ καὶ ἀνηκούστου, ἡ δὲ τοῦ
 ὁρατοῦ καὶ ἀοράτου, καὶ ἡ ὀσφρησις τοῦ ὀσφραντοῦ
 καὶ ἀνοσφραντοῦ. ἀνόσφραντον δὲ τὸ μὲν παρὰ
 τὸ ὅλως ἀδύνατον ἔχειν ὁσμὴν, τὸ δὲ μικρὰν ἔχον
 καὶ φαύλην. ὁμοίως δὲ καὶ τὸ ἄγευστον λέγεται.
 ἔστι δὲ καὶ ἡ ὀσφρησις διὰ τοῦ μεταξύ, οἶον ἀέρος
 10 ἢ ὕδατος· καὶ γὰρ τὰ ἔννυδρα δοκοῦσιν ὁσμῆς
 αἰσθάνεσθαι. ὁμοίως δὲ καὶ τὰ ἔναιμα καὶ τὰ
 ἄναιμα, ὥσπερ καὶ τὰ ἐν τῷ ἀέρι· καὶ γὰρ τούτων

ON THE SOUL, II. ix.

with us more discriminating because it is itself a form of touch, and this sense in man is highly discriminating ; in the other senses he is far behind the animal, but in the matter of touch he is much more discriminating than most of the rest of creation. This is why he is of all living creatures the most capable of thought. Proof of this lies in the fact that among the human race men are well or poorly endowed with intelligence in proportion to their sense of touch, and no other sense ; for men of hard skin and flesh are poorly, and men of soft flesh well endowed with intelligence. And just as flavours are sweet and bitter, so are smells. But though there are some analogies between scents and flavours (I mean, for instance, we can speak of a sweet smell and a sweet taste), yet in some attributes they differ. Scent like flavour may be pungent, rough, acid or oily.

But, as we have said, smells being, unlike flavours, not easily differentiated, they have taken their names from their similarities ; for instance from saffron and honey comes a sweet smell, while from thyme and such things comes a pungent smell. And the same thing is true of all such things. As with the other senses so with hearing : hearing is concerned both with what is heard and what is not heard ; so vision refers to what is seen and what is not seen, and smell to what is smelt and what is not smelt. That which is not smelt means both that which, generally speaking, cannot have smell, and that which has a very small and slight smell. That which has no taste is used in the same sense. But the sense of smell also operates through a medium, such as air or water ; for the water animals also seem to have a sense of smell ; so do both the animals with and those without blood, just

421 b

ἐνια πόρρωθεν ἀπαντὰ πρὸς τὴν τροφὴν ὑποσμά
γινόμενα.

Διὸ καὶ ἄπορον φαίνεται, εἰ πάντα μὲν ὁμοίως
ὀσμᾶται, ὃ δ' ἄνθρωπος ἀναπνέων μὲν, μὴ ἀνα-
15 πνέων δὲ ἄλλ' ἐκπνέων ἢ κατέχων τὸ πνεῦμα οὐκ
ὀσμᾶται, οὔτε πόρρωθεν οὔτ' ἐγγύθεν, οὔδ' ἂν
ἐπὶ τοῦ μυκτῆρος ἐντὸς τεθῇ. καὶ τὸ μὲν ἐπ'
αὐτῷ τιθέμενον τῷ αἰσθητηρίῳ ἀναίσθητον εἶναι
κοινὸν πάντων· ἀλλὰ τὸ ἄνευ τοῦ ἀναπνεῖν μὴ
αἰσθάνεσθαι ἴδιον ἐπὶ τῶν ἀνθρώπων· δῆλον δὲ
20 πειρωμένοις. ὥστε τὰ ἄναιμα, ἐπειδὴ οὐκ ἀνα-
πνέουσιν, ἑτέραν ἂν τιν' αἰσθησιν ἔχει παρὰ τὰς
λεγομένας. ἀλλ' ἀδύνατον, εἴπερ τῆς ὀσμῆς αἰ-
σθάνεται· ἢ γὰρ τοῦ ὀσφραντοῦ αἰσθησις καὶ
δυσώδους καὶ εὐώδους ὀσφρησίς ἐστιν. ἔτι δὲ
καὶ φθειρόμενα φαίνεται ὑπὸ τῶν ἰσχυρῶν ὀσμῶν
25 ὑφ' ὧνπερ ἄνθρωπος, οἷον ἀσφάλτου καὶ θείου
καὶ τῶν τοιούτων. ὀσφραίνεσθαι μὲν οὖν ἀναγ-
καῖον, ἀλλ' οὐκ ἀναπνέοντα.

Ἔοικε δὲ τοῖς ἀνθρώποις διαφέρειν τὸ αἰσθη-
τήριον τοῦτο πρὸς τὸ τῶν ἄλλων ζώων, ὥσπερ
τὰ ὄμματα πρὸς τὰ τῶν σκληροφθάλμων· τὰ μὲν
γὰρ ἔχει φράγμα καὶ ὥσπερ ἑλυτρον τὰ βλέφαρα,
80 ἃ μὴ κινήσας μηδ' ἀνασπάσας οὐχ ὁρᾷ· τὰ δὲ
σκληρόφθαλμα οὐδὲν ἔχει τοιοῦτον, ἀλλ' εὐθέως
ὁρᾷ τὰ γινόμενα ἐν τῷ διαφανεῖ. οὕτως οὖν καὶ
422 a τὸ ὀσφραντικὸν αἰσθητήριον τοῖς μὲν ἀκάλυφες
εἶναι, ὥσπερ τὸ ὄμμα, τοῖς δὲ τὸν ἀέρα δεχο-
μένοις ἔχειν ἐπικάλυμμα, ὃ ἀναπνεόντων ἀπο-
καλύπτεσθαι, διευρυνομένων τῶν φλεβίων καὶ τῶν
πόρων. καὶ διὰ τοῦτο τὰ ἀναπνέοντα οὐκ ὀσμᾶται

ON THE SOUL, II. ix.

as those in air ; for some of these approach from a great distance towards their food guided by the scent.

There is a problem here whether all animals smell in the same way, while man only smells during inhalation; when not inhaling, but either exhaling or holding the breath, man does not smell either at a distance or at close range, nor even if the object of smell is placed within, or up against the nostril. That what is placed on the sense organ should be imperceptible is common to all senses ; but not to smell without inhaling seems to be peculiar to man ; anyone who tries it will find this quite clear. So that apparently bloodless animals, since they do not inhale, would seem to have another sense beyond the usually accepted ones. But this is impossible if they apprehend smell ; for perception of the object smelt, both sweet-smelling and evil-smelling, is a sense of smell. Again, they seem to be destroyed by the same strong smells as a man, such as bitumen, sulphur and the like. So they must smell, but without inhaling.

Probably the sense organ among men is different from that of other living creatures, in the same way as their eyes are different from the animals which have hard eyes ; for men's eyes have lids as a covering, and a sheath as it were, without moving and withdrawing which, they cannot see ; but hard-eyed animals have nothing of the kind, but see directly what appears in the transparency. So, then, the sense organ of smell among animals is uncovered like the eye, but men who admit the air have a veil which is lifted when they inhale, the veins and passages dilating. For this reason inhaling animals do not

How the
sense of
smell oper-
ates.

Man differs
from the
animal.

5 ἐν τῷ ὑγρῷ· ἀναγκαῖον γὰρ ὁσφρανθῆναι ἀναπνεύσαντα, τοῦτο δὲ ποιεῖν ἐν τῷ ὑγρῷ ἀδύνατον. ἔστι δ' ἡ ὁσμὴ τοῦ ξηροῦ, ὥσπερ ὁ χυμὸς τοῦ ὑγροῦ· τὸ δὲ ὁσφραντικὸν αἰσθητήριον δυνάμει τοιοῦτον.

X. Τὸ δὲ γευστὸν ἐστὶν ἀπτὸν τι· καὶ τοῦτ' αἴτιον τοῦ μὴ εἶναι αἰσθητὸν διὰ τοῦ μεταξὺ
 10 ἀλλοτρίου ὄντος σώματος· οὐδὲ γὰρ ἡ ἀφή. καὶ τὸ σῶμα δὲ ἐν ᾧ ὁ χυμὸς, τὸ γευστὸν, ἐν ὑγρῷ ὡς ὕλη· τοῦτο δ' ἀπτὸν τι. διὸ καὶ ἐν ὕδατι εἴμεν, αἰσθανοίμεθ' ἂν ἐμβληθέντος τοῦ γλυκέος, οὐκ ἦν δ' ἂν ἡ αἴσθησις ἡμῖν διὰ τοῦ μεταξύ, ἀλλὰ τῷ μιχθῆναι τῷ ὑγρῷ, καθάπερ ἐπὶ τοῦ
 15 ποτοῦ. τὸ δὲ χρῶμα οὐχ οὕτως ὁράται τῷ μίγνυσθαι, οὐδὲ ταῖς ἀπορροαῖς. ὥς μὲν οὖν τὸ μεταξύ οὐθέν ἐστίν· ὥς δὲ χρῶμα τὸ ὁρατόν, οὕτω τὸ γευστὸν ὁ χυμὸς. οὐθέν δὲ ποιεῖ χυμοῦ αἴσθησιν ἄνευ ὑγρότητος, ἀλλ' ἔχει ἐνεργεῖα ἣ δυνάμει ὑγρότητα, οἷον τὸ ἀλμυρόν· εὐτηκτόν τε γὰρ αὐτὸ καὶ συντηκτικὸν γλώττης.

20 Ὡσπερ δὲ καὶ ἡ ὄψις ἐστὶ τοῦ τε ὁρατοῦ καὶ τοῦ ἀοράτου (τὸ γὰρ σκότος ἀόρατον, κρίνει δὲ καὶ τοῦτο ἡ ὄψις), ἔτι τοῦ λίαν λαμπροῦ (καὶ γὰρ τοῦτο ἀόρατον, ἄλλον δὲ τρόπον τοῦ σκότους), ὁμοίως δὲ καὶ ἡ ἀκοὴ ψόφου τε καὶ σιγῆς, ὧν τὸ μὲν ἀκουστὸν τὸ δ' οὐκ ἀκουστόν, καὶ μεγάλου
 25 ψόφου, καθάπερ ἡ ὄψις τοῦ λαμπροῦ· ὥσπερ γὰρ ὁ μικρὸς ψόφος ἀνήκουστος τρόπον τινά, καὶ ὁ μέγας τε καὶ ὁ βίαιος· ἀόρατον δὲ τὸ μὲν ὅλως λέγεται, ὥσπερ καὶ ἐπ' ἄλλων τὸ ἀδύνατον, τὸ δ',

ON THE SOUL, II. IX.—X.

smell in water ; for they can only smell when inhaling, and it is impossible to do this in water. Smell is of the dry, as flavour is of the wet. Such is the nature of the organ of smell potentially.

X. An object of taste is an object of touch ; and this is the reason why it is not perceived through the medium of any foreign body ; for the same thing is true of touch. The body in which flavour resides, that is the object of taste, is in liquid as its matter ; and this is tangible. And so, even if we were in water, we should perceive sweetness injected into it, but our perception would not come through any medium, but by being mixed with the water, just as in a drink. But colour is not seen by being mixed, nor by an emanation. There is nothing, then, in the place of a medium ; but as that which is seen is a colour, so that which is tasted is a flavour. But nothing can produce a perception of flavour without liquid ; it must possess wetness actually or potentially, like salt ; for that is soluble and easily liquefied by the tongue.

Taste like touch requires no medium,

but liquid must be present.

Now the power of sight is concerned both with what can be seen and what cannot (for darkness cannot be seen, and the power of sight recognizes this), and also with that which is too bright (for this also cannot be seen, though in a different sense from darkness), and in the same way the power of hearing is concerned both with sound and silence, the former being that which is heard, and the latter that which is not heard including a very loud noise, exactly as the vision is concerned with the too bright ; for as a slight sound is in a sense inaudible, so also is a loud and violent one ; the word invisible is then used quite generally, like the word impossible to see in another

422 a

ἐὰν πεφυκὸς μὴ ἔχῃ ἢ φαύλως, ὥσπερ τὸ ἄπουν
καὶ τὸ ἀπύρηνον· οὕτω δὴ καὶ ἡ γεῦσις τοῦ
30 γευστοῦ τε καὶ ἀγεύστου· τοῦτο δὲ τὸ μικρὸν ἢ
φαῦλον ἔχον χυμὸν ἢ φθαρτικὸν τῆς γεύσεως.
δοκεῖ δ' εἶναι ἀρχὴ τὸ ποτὸν καὶ ἄποτον· γεῦσις
γάρ τις ἀμφότερα· ἀλλὰ τὸ μὲν φαύλη καὶ φθαρ-
τικὴ τῆς γεύσεως, τὸ δὲ κατὰ φύσιν. ἔστι δὲ
κοινὸν ἀφῆς καὶ γεύσεως τὸ ποτόν.

422 b

Ἐπεὶ δ' ὑγρὸν τὸ γευστόν, ἀνάγκη καὶ τὸ
αἰσθητήριον αὐτοῦ μήτε ὑγρὸν εἶναι ἐντελεχείᾳ
μήτε ἀδύνατον ὑγραίνεσθαι· πάσχει γάρ τι ἢ γεῦ-
σις ὑπὸ τοῦ γευστοῦ, ἢ γευστόν. ἀναγκαῖον ἄρα
ὑγρανθῆναι τὸ δυνάμενον μὲν ὑγραίνεσθαι σωζό-
6 μενον, μὴ ὑγρὸν δέ, τὸ γευστικὸν αἰσθητήριον.
σημεῖον δὲ τὸ μήτε κατάξηρον οὔσαν τὴν γλώτταν
αἰσθάνεσθαι μήτε λίαν ὑγράν· αὕτη γὰρ ἀφή γί-
νεται τοῦ πρώτου ὑγροῦ, ὥσπερ ὅταν προγευμα-
τίσας τις ἰσχυροῦ χυμοῦ γεύηται ἐτέρου· καὶ
οἶον τοῖς κάμνουσι πικρὰ πάντα φαίνεται διὰ τὸ
10 τῇ γλώττῃ πλήρει τοιαύτης ὑγρότητος αἰσθάνε-
σθαι. τὰ δ' εἶδη τῶν χυμῶν, ὥσπερ καὶ ἐπὶ τῶν
χρωμάτων, ἀπλᾶ μὲν τάναντία, τὸ γλυκὺ καὶ τὸ
πικρὸν, ἐχόμενα δὲ τοῦ μὲν τὸ λιπαρόν, τοῦ δὲ τὸ
ἀλμυρόν· μεταξὺ δὲ τούτων τό τε δριμὺ καὶ τὸ
αὐστηρὸν καὶ στρυφνὸν καὶ ὀξύ· σχεδὸν γὰρ αὐται
15 δοκοῦσιν εἶναι διαφοραὶ χυμῶν. ὥστε τὸ γευ-
στικὸν ἐστὶ τὸ δυνάμει τοιοῦτον, γευστόν δὲ τὸ
ποιητικὸν ἐντελεχείᾳ αὐτοῦ.

XI. Περὶ δὲ τοῦ ἄποτοῦ καὶ ἀφῆς ὁ αὐτὸς λόγος.

ON THE SOUL, II. x.—xi.

connexion, and also in the sense of not having the quality or having it to a very small extent, though by nature qualified to possess it, like the words footless or stoneless. In just the same way the sense of taste is concerned both with that which is tasted and that which is not; the latter being that which has little or slight taste, or which is destructive of taste. Our starting-point then seems to be drinkable and undrinkable; for each implies a tasting; but the latter is slight or destructive of taste, while the former is natural. But the drinkable is common both to touch and taste.

Since what is tasted is wet, the sense organ which perceives it must be not actually liquid but capable of liquefaction; for the sense of taste is affected by what is tasted, in so far as it is tasted. The sense organ of taste, then, is that which is capable of becoming liquefied, while preserving its identity, but is not itself liquid. This is proved by the fact that the tongue cannot taste when it is dry, nor when too wet; for this contact takes place with the first moisture, just as when a man having previously tasted a strong flavour meets another flavour; and so when a man is ill everything tastes bitter, because he is perceiving it with a tongue infected with a bitter taste. But the types of flavours, just as in the case of colours, in their simplest form are opposite, sweet and bitter, but connected with these are oily and saline; in between these come acid, pungent, astringent and sharp. These seem to be nearly all the differences in flavours. The faculty of taste is potentially like this, while that which makes it actually so is the object tasted.

XI. The same account applies to the tangible and Touch.

422 b

εἰ γὰρ ἡ ἀφή μὴ μία ἐστὶν αἴσθησις ἀλλὰ πλείους,
 ἀναγκαῖον καὶ τὰ ἀπτὰ αἰσθητὰ πλείω εἶναι.
 20 ἔχει δ' ἀπορίαν πότερον πλείους εἰσὶν ἢ μία, καὶ
 τί τὸ αἰσθητήριον τὸ τοῦ ἀπτοῦ ἀπτικόν, πότερον
 ἡ σὰρξ καὶ ἐν τοῖς ἄλλοις τὸ ἀνάλογον, ἢ οὐ, ἀλλὰ
 τοῦτο μὲν ἐστὶ τὸ μεταξύ, τὸ δὲ πρῶτον αἰσθη-
 τήριον ἄλλο τί ἐστὶν ἐντός. πᾶσά τε γὰρ αἴσθησις
 μιᾶς ἐναντιώσεως εἶναι δοκεῖ, οἷον ὄψις λευκοῦ
 25 καὶ μέλανος καὶ ἀκοή ὀξέος καὶ βαρέος καὶ γεῦσις
 πικροῦ καὶ γλυκέος· ἐν δὲ τῷ ἀπτῷ πολλαὶ ἐνεῖσιν
 ἐναντιώσεις, θερμὸν ψυχρόν, ξηρόν ὑγρόν, σκληρόν
 μαλακόν, καὶ τῶν ἄλλων ὅσα τοιαῦτα. ἔχει δέ
 τινα λύσιν πρὸς γε ταύτην τὴν ἀπορίαν, ὅτι καὶ
 ἐπὶ τῶν ἄλλων αἰσθήσεών εἰσιν ἐναντιώσεις
 30 πλείους, οἷον ἐν φωνῇ οὐ μόνον ὀξύτης καὶ
 βαρύτης, ἀλλὰ καὶ μέγεθος καὶ μικρότης καὶ
 λειότης καὶ τραχύτης φωνῆς καὶ τοιαῦθ' ἕτερα.
 εἰσὶ δὲ καὶ περὶ χρῶμα διαφοραὶ τοιαῦται ἕτεραι.
 ἀλλὰ τί τὸ ἐν τὸ ὑποκείμενον, ὥσπερ ἀκοῇ ψόφος,
 οὕτω τῇ ἀφῇ, οὐκ ἔστιν ἐνδηλον.

Πότερον δ' ἐστὶ τὸ αἰσθητήριον ἐντός, ἢ οὐ,
 423 a ἀλλ' εὐθέως ἢ σὰρξ; οὐδὲν δοκεῖ σημεῖον εἶναι
 τὸ γίνεσθαι τὴν αἴσθησιν ἅμα θιγγανομένων. καὶ
 γὰρ νῦν εἴ τις περὶ τὴν σάρκα περιτείνειεν οἷον
 ὑμένα ποιήσας, ὁμοίως τὴν αἴσθησιν εὐθέως ἀψά-
 μενος ἐνσημαίνει· καίτοι δῆλον ὥς οὐκ ἔστιν ἐν
 5 τούτῳ τὸ αἰσθητήριον· εἰ δὲ καὶ συμφυὲς γένοιτο,
 θᾶπτον ἔτι διῖκνοϊτ' ἂν ἡ αἴσθησις. διὸ τὸ τοιοῦτο
 μόριον τοῦ σώματος ἔοικεν οὕτως ἔχειν ὥσπερ ἂν
 εἰ κύκλῳ ἡμῖν περιεπεφύκει ὁ ἀήρ· ἐδοκοῦμεν

ON THE SOUL, II. XI.

the sense of touch. For if touch is not one sense, but more than one, objects of touch must also be plural. It is difficult to determine whether touch is one sense or more than one, and what the sense organ is which is affected by the object of touch, whether it is flesh, and whatever is analogous to this in creatures without flesh, or whether this is only the medium, and the primary sense organ is something distinct and internal. For every sensation appears to be concerned with one pair of opposites, just as vision is sight of white and black, hearing of high and low pitch, and taste of bitter and sweet ; but in the object touched there are many pairs of opposites, hot and cold, dry and wet, hard and soft, and many other similar pairs. Some solution may be found to this difficulty in the fact that the other senses too are conscious of more than one pair of opposites : so in voice there is not merely high and low pitch, but also loud and soft, smooth and rough, and so on. There are similarly other differences in colour. But what is the single basis in the case of touch corresponding to sound in hearing is not obvious.

Whether the sense organ is within, or whether the flesh feels directly, is not proved by the fact that things feel as soon as they are touched. For if one were to surround the whole flesh with a membrane, for instance, the moment it touched an object sensation would be registered. And yet it is quite clear that the sense organ would not reside in the membrane ; though if it grew to be one with the flesh, the sensation would be transmitted even more quickly. So this part of the body appears to be in the same position as if the air were naturally attached to us in

What is the sense organ of touch?

423 a

γὰρ ἂν ἐνί τινι αἰσθάνεσθαι καὶ ψόφου καὶ χρώ-
 ματος καὶ ὁσμῆς, καὶ μία τις αἴσθησις εἶναι ὅψις
 10 ἀκοή ὁσφρησις. νῦν δὲ διὰ τὸ διωρίσθαι δι' οὗ
 γίνονται αἱ κινήσεις, φανερά τὰ εἰρημένα αἰσθη-
 τήρια ἕτερα ὄντα. ἐπὶ δὲ τῆς ἀφῆς τοῦτο νῦν
 ἄδηλον· ἐξ αἰέρος μὲν γὰρ ἢ ὕδατος ἀδύνατον συ-
 στήναι τὸ ἔμψυχον σῶμα· δεῖ γάρ τι στερεὸν
 εἶναι. λείπεται δὴ μικτὸν ἐκ γῆς καὶ τούτων
 15 εἶναι, οἷον βούλεται ἢ σὰρξ καὶ τὸ ἀνάλογον· ὥστε
 ἀναγκαῖον καὶ τὸ σῶμα εἶναι μεταξὺ τοῦ ἀπτικού
 προσπεφυκὸς, δι' οὗ γίνονται αἱ αἰσθήσεις πλείους
 οὔσαι. δηλοῖ δ' ὅτι πλείους ἢ ἐπὶ τῆς γλώττης
 ἀφή· ἀπάντων γὰρ τῶν ἀπτῶν αἰσθάνεται κατὰ
 τὸ αὐτὸ μόριον καὶ χυμοῦ. εἰ μὲν οὖν καὶ ἡ
 20 ἄλλη σὰρξ ἠσθάνετο τοῦ χυμοῦ, ἔδόκει ἂν ἡ αὐτὴ
 καὶ μία εἶναι αἴσθησις ἢ γεῦσις καὶ ἡ ἀφή· νῦν
 δὲ δύο διὰ τὸ μὴ ἀντιστρέφειν.

Ἀπορήσειε δ' ἂν τις, εἰ πᾶν σῶμα βάθος ἔχει·
 τοῦτο δ' ἐστὶ τὸ τρίτον μέγεθος· ὣν δ' ἐστὶ δύο
 σωμάτων μεταξὺ σῶμά τι, οὐκ ἐνδέχεται ταῦτα
 ἀλλήλων ἄπτεσθαι. τὸ δ' ὑγρὸν οὐκ ἔστιν ἄνευ
 25 σώματος, οὐδὲ τὸ διερόν, ἀλλ' ἀναγκαῖον ὕδωρ
 εἶναι ἢ ἔχειν ὕδωρ. τὰ δὲ ἀπτόμενα ἀλλήλων ἐν
 τῷ ὕδατι, μὴ ξηρῶν τῶν ἄκρων ὄντων, ἀναγκαῖον
 ὕδωρ ἔχειν μεταξύ, οὗ ἀνάπλεα τὰ ἔσχατα. εἰ
 δὲ τοῦτ' ἀληθές, ἀδύνατον ἄψασθαι ἄλλο ἄλλου
 ἐν ὕδατι. τὸν αὐτὸν δὲ τρόπον καὶ ἐν τῷ αέρι·
 30 ὁμοίως γὰρ ἔχει ὁ ἀῆρ πρὸς τὰ ἐν αὐτῷ καὶ τὸ
 ὕδωρ πρὸς τὰ ἐν τῷ ὕδατι. λανθάνει δὲ μᾶλλον
 423 b ἡμᾶς, ὥσπερ καὶ τὰ ἐν τῷ ὕδατι ζῶα, εἰ διερόν

ON THE SOUL, II. XI.

a circle ; for in that case we should suppose that our perception of sound, colour, and smell were all due to the one thing, and that vision, hearing, and smell were all one and the same sensation. But, as it is, having laid down the medium through which the movements occur, it is obvious that the sense organs mentioned are different. But in the case of touch this is not obvious ; for the body possessing soul cannot be made of water or air ; it must be something solid. The only alternative is that it is a mixture of earth and such substances as flesh and the like claim to be ; so that the body must be the natural medium of the tangible, through which the various sensations arise. And it shows that the sense of touch on the tongue is really plural ; for the tongue perceives all tangible objects with the same part as it perceives flavour. If then the rest of the flesh could perceive flavour, tasting and touch would seem to be one and the same sensation. But, as it is, they are proved two, because they are not convertible.

But here a difficulty arises ; every body has depth ; this is the third dimension ; in a case, then, in which a body exists between two others, the two cannot touch each other. But the liquid and wet cannot exist without a body, and the body must either be, or contain, water. Those things, then, which touch each other in water, as their extremities are not dry, must have water between them, of which their extremities are full. If this is true, then it is impossible for one thing to touch another in water. The same thing will be true of air, for air has the same relation to things in it, as water has to things in water. But we do not notice the problem in the case of water, just as animals living in water do not notice if wet touches

The medium
in the case
of touch.

διεροῦ ἄπτεται. πότερον οὖν πάντων ὁμοίως ἐστὶν
 ἡ αἰσθησις, ἢ ἄλλων ἄλλως, καθάπερ νῦν δοκεῖ
 ἡ μὲν γεῦσις καὶ ἡ ἀφή τῷ ἄπτεσθαι, αἶ δ' ἄλλαι
 ἀποθεν; τὸ δ' οὐκ ἔστιν, ἀλλὰ καὶ τὸ σκληρὸν
 5 καὶ τὸ μαλακὸν δι' ἐτέρων αἰσθανόμεθα, ὥσπερ
 καὶ τὸ ψοφητικὸν καὶ τὸ ὄρατὸν καὶ τὸ ὀσφραντόν·
 ἀλλὰ τὰ μὲν πόρρωθεν, τὰ δ' ἐγγύθεν. διὸ λαν-
 θάνει, ἐπεὶ αἰσθανόμεθά γε πάντων διὰ τοῦ μέσου·
 ἀλλ' ἐπὶ τούτων λανθάνει. καίτοι καθάπερ εἶπαμεν
 καὶ πρότερον, κὰν εἰ δι' ὑμένοιο αἰσθανοίμεθα τῶν
 10 ἄπτων ἀπάντων λανθάνοντος ὅτι διείργει, ὁμοίως
 ἂν ἔχοιμεν ὥσπερ καὶ νῦν ἐν τῷ ὕδατι καὶ ἐν τῷ
 ἀέρι· δοκοῦμεν γὰρ αὐτῶν ἄπτεσθαι καὶ οὐδὲν
 εἶναι διὰ μέσου. ἀλλὰ διαφέρει τὸ ἄπτὸν τῶν
 ὄρατῶν καὶ τῶν ψοφητικῶν, ὅτι ἐκείνων μὲν
 αἰσθανόμεθα τῷ τὸ μεταξὺ ποιεῖν τι ἡμᾶς, τῶν
 15 δὲ ἄπτων οὐχ ὑπὸ τοῦ μεταξὺ ἀλλ' ἅμα τῷ μεταξὺ,
 ὥσπερ ὁ δι' ἀσπίδος πληγείς· οὐ γὰρ ἡ ἀσπίς
 πληγείσα ἐπάταξεν, ἀλλ' ἅμ' ἅμφω¹ συνέβη πλη-
 γῆναι. ὅλως δ' ἔοικεν ἡ σὰρξ καὶ ἡ γλῶττα, ὡς
 ὁ ἀῆρ καὶ τὸ ὕδωρ πρὸς τὴν ὄψιν καὶ τὴν ἀκοήν
 καὶ τὴν ὀσφρησιν ἔχουσιν, οὕτως ἔχειν πρὸς τὸ
 20 αἰσθητήριον ὥσπερ ἐκείνων ἕκαστον. αὐτοῦ δὲ
 τοῦ αἰσθητηρίου ἀπτομένου οὐτ' ἐκεῖ οὐτ' ἐνταῦθα
 γένοιτ' ἂν αἰσθησις, οἷον εἴ τις σῶμα τὸ λευκὸν
 ἐπὶ τοῦ ὄμματος θείῃ τὸ ἔσχατον. ἢ καὶ δῆλον
 ὅτι ἐντὸς τοῦ ἀπτοῦ αἰσθητικόν. οὕτω γὰρ
 ἂν συμβαίνοι ὅπερ καὶ ἐπὶ τῶν ἄλλων· ἐπι-
 25 τιθεμένων γὰρ ἐπὶ τὸ αἰσθητήριον οὐκ αἰσθάνεται,

¹ ἀλλ' ἀμφω B.

ON THE SOUL, II. XI.

wet. Is then the perception of all things one only, or is it different of different things, just as it is now generally supposed that taste and touch both act by contact, but that the other senses act at a distance? This is not the truth, but we perceive hard and soft through a medium, just as we apprehend what sounds, or is heard, or smelt. But we perceive the latter from a distance, the former from near by. So we do not notice that we perceive all things through a medium; but in the case of objects of touch the medium is not obvious. Still, as we have said before, if we were to perceive all tangible things through a membrane, without noticing the separation caused by it, we should react exactly in the same way as we do now in water and in air; for we seem to touch them directly without the intervention of any medium. But there is a difference between tangible things, and visible or audible things. We perceive the latter because some medium acts on us, but we perceive tangible things not by a medium, but at the same time as the medium, like a man wounded through his shield; for it is not the stricken shield that struck him, but both he and the shield were struck simultaneously. In a general sense we may say that just as the air and the water act in the case of vision, hearing and smell, so is the relation of the flesh and the tongue to the sense organ in the case of touch. In neither class of case mentioned would sensation result from touching the sense organ; for instance, if one were to put a white body on the surface of the eye. From this it is clear that that which is perceptive of what is touched is within. Thus would occur what is true in the other cases; for when placed on the other sense organs no sensation occurs, but

423 b

ἐπὶ δὲ τὴν σάρκα ἐπιτιθεμένων αἰσθάνεται ὥστε
τὸ μεταξὺ τοῦ ἀπτικοῦ ἢ σάρξ.

Ἀπταὶ μὲν οὖν εἰσὶν αἰδιαφοραὶ τοῦ σώματος ἢ
σῶμα· λέγω δὲ διαφορὰς αἰ τὰ στοιχεῖα διορίζουσι,
θερμὸν ψυχρόν, ξηρὸν ὑγρόν, περὶ ὧν εἰρήκαμεν
πρότερον ἐν τοῖς περὶ στοιχείων. τὸ δὲ αἰσθη-

80 τήριον αὐτῶν τὸ ἀπτικόν, καὶ ἐν ᾧ ἢ καλουμένη
ἀφή ὑπάρχει πρῶτω, τὸ δυνάμει τοιοῦτόν ἐστι

424 a μόριον· τὸ γὰρ αἰσθάνεσθαι πάσχειν τι ἐστίν.

ὥστε τὸ ποιοῦν οἷον αὐτὸ ἐνεργεία, τοιοῦτον ἐκείνο
ποιεῖ δυνάμει ὄν. διὸ τοῦ ὁμοίως θερμοῦ καὶ
ψυχροῦ ἢ σκληροῦ καὶ μαλακοῦ οὐκ αἰσθανόμεθα,
ἀλλὰ τῶν ὑπερβολῶν, ὡς τῆς αἰσθήσεως οἷον

δ μεσότητός τινος οὔσης τῆς ἐν τοῖς αἰσθητοῖς ἐναν-
τιώσεως. καὶ διὰ τοῦτο κρίνει τὰ αἰσθητά. τὸ

γὰρ μέσον κριτικόν· γίνεται γὰρ πρὸς ἐκάτερον
αὐτῶν θάτερον τῶν ἄκρων· καὶ δεῖ ὥσπερ τὸ
μέλλον αἰσθήσεσθαι λευκοῦ καὶ μέλανος μηδέτερον
αὐτῶν εἶναι ἐνεργεία, δυνάμει δ' ἄμφω, οὕτω δὲ

10 καὶ ἐπὶ τῶν ἄλλων καὶ ἐπὶ τῆς ἀφῆς μήτε θερμὸν
μήτε ψυχρόν. ἔτι δ' ὥσπερ ὁρατοῦ καὶ ἀοράτου

ἦν πως ἢ ὄψις, ὁμοίως δὲ καὶ αἱ λοιπαὶ τῶν ἀντι-
κειμένων, οὕτω καὶ ἡ ἀφή τοῦ ἀπτοῦ καὶ ἀνάπτου·
ἀναπτον δ' ἐστὶ τό τε μικρὰν ἔχον πάμπαν δια-
φορὰν τῶν ἀπτῶν, οἷον πέπονθεν ὁ ἀήρ, καὶ τῶν

15 ἀπτῶν αἱ ὑπερβολαί, ὥσπερ τὰ φθαρτικά. καθ'
ἐκάστην μὲν οὖν τῶν αἰσθήσεων εἴρηται τύπῳ.

^a *De Gen. et Corr.* cc. ii. and iii.

ON THE SOUL, II. xi.

when placed on the flesh it does ; so that the medium in tangible things is the flesh.

The distinguishing characteristics of the body, *qua* body, are objects of touch ; by distinguishing characteristics I mean those which differentiate the elements hot and cold, dry and wet, about which we have spoken before in our discussion of the elements.^a But the sense organ which perceives them is the sense of touch, and that in which the sense of touch, as it is called, primarily resides, a part which has potentially the qualities of the objects touched. For perception is a form of being acted upon. So that what makes something actually like itself has these qualities potentially itself. Consequently we have no sensation of what is as hot, cold, hard, or soft as we are, but only of what is more so, sensation being then a sort of mean between opposites in things felt. And it is because of this that a man discriminates between things felt. For the mean is capable of discriminating ; for it becomes an extreme in relation to each of the extremes in turn ; and just as that which is going to perceive white and black must be actually neither, but potentially both, so also in other cases, and particularly in the case of touch, it must be neither hot nor cold. And just as we saw that vision relates both to the visible and the invisible, and so also in the same way with the remaining contraries, so touch must relate both to the tangible and intangible ; by intangible we mean what has the quality of the tangible to an extremely small extent, as is the case with air, and also those excesses among tangible things, such as those which destroy. Now we have described in outline each of the senses.

^a The sense is a mean.

XII. Καθόλου δὲ περὶ πάσης αἰσθήσεως δεῖ λαβεῖν ὅτι ἡ μὲν αἰσθησίς ἐστι τὸ δεκτικὸν τῶν αἰσθητῶν εἰδῶν ἄνευ τῆς ὕλης, οἷον ὁ κηρὸς τοῦ
 20 δακτυλίου ἄνευ τοῦ σιδήρου καὶ τοῦ χρυσοῦ δέχεται τὸ σημεῖον, λαμβάνει δὲ τὸ χρυσοῦν ἢ τὸ χαλκοῦν σημεῖον, ἀλλ' οὐχ ἡ χρυσὸς ἢ χαλκός, ὁμοίως δὲ καὶ ἡ αἰσθησις ἐκάστου ὑπὸ τοῦ ἔχοντος χρώμα ἢ χυμὸν ἢ ψόφον πάσχει, ἀλλ' οὐχ ἡ ἑκαστον ἐκείνων λέγεται, ἀλλ' ἡ τοιονδί, καὶ κατὰ
 25 τὸν λόγον. αἰσθητήριον δὲ πρῶτον ἐν ᾧ ἡ τοιαύτη δύναμις. ἔστι μὲν οὖν ταυτόν, τὸ δ' εἶναι ἕτερον· μέγεθος μὲν γὰρ ἂν τι εἴη τὸ αἰσθανόμενον· οὐ μὴν τό γε αἰσθητικῶ εἶναι, οὐδ' ἡ αἰσθησις μέγεθός ἐστιν, ἀλλὰ λόγος τις καὶ δύναμις ἐκείνου. φανερόν δ' ἐκ τούτων καὶ διὰ τί ποτε τῶν
 30 αἰσθητῶν αἱ ὑπερβολαὶ φθείρουσι τὰ αἰσθητήρια· ἐὰν γὰρ ἡ ἰσχυροτέρα τοῦ αἰσθητηρίου ἡ κίνησις, λύεται ὁ λόγος· τοῦτο δ' ἦν ἡ αἰσθησις, ὥσπερ καὶ ἡ συμφωνία καὶ ὁ τόνος κρουομένων σφόδρα τῶν χορδῶν. καὶ διὰ τί ποτε τὰ φυτὰ οὐκ αἰσθάνεται, ἔχοντά τι μόριον ψυχικὸν καὶ πάσχοντά
 424 b τι ὑπὸ τῶν ἀπτῶν· καὶ γὰρ ψύχεται καὶ θερμαίνεται· αἴτιον γὰρ τὸ μὴ ἔχειν μεσότητα, μηδὲ τοιαύτην ἀρχὴν οἶαν τὰ εἶδη δέχεσθαι τῶν αἰσθητῶν, ἀλλὰ πάσχειν μετὰ τῆς ὕλης. ἀπορήσειε δ' ἂν τις εἰ πάθοι ἄν τι ὑπ' ὁσμῆς τὸ ἀδύνατον
 5 ὁσφρανθῆναι, ἢ ὑπὸ χρώματος τὸ μὴ δυνάμενον ἰδεῖν· ὁμοίως δὲ καὶ ἐπὶ τῶν ἄλλων. εἰ δὲ τὸ ὁσφραντὸν ὁσμῇ, εἴ τι ποιεῖ τὴν ὁσφρησιν, ἢ

ON THE SOUL, II. XII.

XII. On the general question of sensation one must lay down that sensation is the reception of the form of sensible objects without the matter, just as the wax receives the impression of the signet-ring without the iron or the gold, and receives the impression of the gold or bronze, but not as gold or bronze ; so the sense is affected by each thing which has colour, or flavour, or sound ; not in the sense in which each of them is so called, but in the sense that its character is of this kind, and in virtue of its form. And the sense organ in its primary meaning is that in which this capacity lies. The sense organ and the capacity exist in conjunction, but their essential nature is not the same ; for that which perceives has a definite magnitude ; but its capacity for perceiving has not, nor is sensation a magnitude, but the form and potentiality of this. From this it is also clear why excess of objects perceived destroy the sense organs ; for if the movement imparted to the sense organ is too strong, the form is destroyed ; and this form is the sensation ; just as the harmony and musical note is destroyed when the strings are struck hard. It also explains why plants do not feel, though they have some share in the soul, and are affected to some extent by objects touched ; for they show both cold and heat ; the reason is that they have no mean, nor any such first principle so as to receive the form of sensible objects, but are affected by the matter at the same time as the form. One might wonder whether anything that cannot smell is affected at all by smell, or that which cannot see by colour ; and in the same way with all other sensible objects. But seeing that smell is of the thing smelt, if anything affects the sense of smell, it must be smell, so

Definition of
sensation.

ὁσμή ποιεῖ. ὥστε τῶν ἀδυνάτων ὁσφρανθῆναι
 οὐθέν οἶόν τε πάσχειν ὑπ' ὀδμῆς· ὁ δ' αὐτὸς
 λόγος καὶ ἐπὶ τῶν ἄλλων· οὐδὲ τῶν δυνατῶν,
 ἀλλ' ἢ αἰσθητικὸν ἕκαστον. ἅμα δὲ δῆλον καὶ
 10 οὕτως. οὔτε γὰρ φῶς καὶ σκότος οὔτε ψόφος
 οὔτε ὁσμή οὐδὲν ποιεῖ τὰ σώματα, ἀλλ' ἐν οἷς
 ἐστίν, οἶον ἀήρ ὁ μετὰ βροντῆς διΐστησι τὸ ξύλον.
 ἀλλὰ τὰ ἀπτά καὶ οἱ χυμοὶ ποιοῦσιν· εἰ γὰρ μή,
 ὑπὸ τίνος ἂν πάσχοι τὰ ἄψυχα καὶ ἀλλοιοῖτο;
 ἀρ' οὖν κάκεῖνα ποιήσει; ἢ οὐ πᾶν σῶμα παθη-
 15 τικὸν ὑπ' ὀσμῆς καὶ ψόφου· καὶ τὰ πάσχοντα
 ἀόριστα, καὶ οὐ μένει, οἶον ἀήρ· ὅζι γὰρ ὥσπερ
 παθὼν τι. τί οὖν ἐστὶ τὸ ὁσμᾶσθαι παρὰ τὸ
 πάσχειν τι; ἢ τὸ μὲν ὁσμᾶσθαι αἰσθάνεσθαι, ὁ
 δ' ἀήρ παθὼν ταχέως αἰσθητὸς γίνεται.

ON THE SOUL, II. XII.

that it is impossible for anything which cannot smell to be affected by a smell ; and the same argument applies to the other senses ; nor can any of those things which can be acted upon be affected, except in so far as each has the sense in question. And the point is equally clear from the following argument. For neither light and darkness, nor sound, nor smell affect the bodies at all : it is the things in which they reside that produce the effect, just as the air splits wood when combined with thunder. But it may be said that tangible objects and flavours do affect bodies ; otherwise, by what should things not possessing soul be affected and changed ? Will then the objects of other senses affect things ? Or perhaps it is not every body that is affected by smell and sound : the things affected are indefinable and are not permanent, such as air ; for it smells as though affected somehow. What, then, is smelling apart from being affected in some way ? Probably smelling is perception, but the air when affected quickly becomes perceptible.

Γ

424 b

Ι. Ὅτι δ' οὐκ ἔστιν αἰσθησις ἑτέρα παρὰ τὰς
 πέντε (λέγω δὲ ταύτας ὄψιν, ἀκοήν, ὄσφρησιν,
 γεῦσιν, ἀφήν), ἐκ τῶνδε πιστεύσειεν ἂν τις. εἰ
 25 γὰρ παντὸς οὐ ἔστιν αἰσθησις ἀφή, καὶ νῦν
 αἰσθησιν ἔχομεν (πάντα γὰρ τὰ τοῦ ἀπτοῦ ἢ
 ἀπτὸν πάθη τῇ ἀφῇ ἡμῖν αἰσθητά ἐστιν), ἀνάγκη
 τ', εἴπερ ἐκλείπει τις αἰσθησις, καὶ αἰσθητήριόν
 τι ἡμῖν ἐκλείπειν· καὶ ὅσων μὲν αὐτῶν ἀπτόμενοι
 αἰσθανόμεθα, τῇ ἀφῇ αἰσθητά ἐστιν, ἣν τυγχά-
 νομεν ἔχοντες· ὅσα δὲ διὰ τῶν μεταξὺ, καὶ μὴ
 30 αὐτῶν ἀπτόμενοι, τοῖς ἀπλοῖς, λέγω δ' οἶον ἀέρι
 καὶ ὕδατι. ἔχει δ' οὕτως, ὥστ' εἰ μὲν δι' ἐνὸς
 πλείω αἰσθητὰ ἕτερα ὄντα ἀλλήλων τῷ γένει,
 ἀνάγκη τὸν ἔχοντα τὸ τοιοῦτον αἰσθητήριον ἀμ-
 φοῖν αἰσθητικὸν εἶναι· οἶον εἰ ἐξ ἀέρος ἐστὶ τὸ
 αἰσθητήριον, καὶ ἔστιν ὁ ἀήρ καὶ ψόφου καὶ
 425 a χροᾶς. εἰ δὲ πλείω τοῦ αὐτοῦ, οἶον χροᾶς καὶ
 ἀήρ καὶ ὕδωρ (ἄμφω γὰρ διαφανῇ), καὶ ὁ τὸ
 ἕτερον αὐτῶν ἔχων μόνον αἰσθήσεται ἀμφοῖν.
 τῶν δὲ ἀπλῶν ἐκ δύο τούτων αἰσθητήρια μόνον
 ἐστίν, ἐξ ἀέρος καὶ ὕδατος· ἡ μὲν γὰρ κόρη

BOOK III

I. One may be satisfied that there are no senses apart from the five (I mean vision, hearing, smell, taste and touch) from the following arguments. We may assume that we actually have perception of everything which is apprehended by touch (for by touch we perceive all those things which are qualities of the tangible object, *qua* tangible). Again, if we lack any perception, we must lack some sense organ ; and, again, all the things which we perceive by touching them are perceived by touch, a sense which we happen to possess ; but all those things which are perceived through media, and not by actually touching them, are perceived through simple elements, such as air and water. Again, it is a fact that, if things differing from one another in kind are perceived through one medium, the man who has the appropriate sense organ will apprehend both (for instance, if the sense organ is composed of air, air is the medium both of sound and of colour), but if more than one thing is the medium of the same thing, as for instance both air and water are the media through which colour is perceived (for both are transparent), then he that has either of these will perceive both. But sense organs are only composed of these two simple elements, air and water (for the pupil of the eye is composed of water, and the hearing

There are
only five
senses.

5 ὕδατος, ἢ δ' ἀκοὴ ἀέρος, ἢ δ' ὄσφρησις θατέρου
 τούτων. τὸ δὲ πῦρ ἢ οὐθενός ἢ κοινὸν πάντων.
 οὐθέν γὰρ ἄνευ θερμότητος αἰσθητικόν. γῆ δὲ
 ἢ οὐθενός, ἢ ἐν τῇ ἀφῇ μάλιστα μέμικται ἰδίως.
 διὸ λείποιν' ἂν μηθὲν εἶναι αἰσθητήριον ἔξω ὕδατος
 καὶ ἀέρος. ταῦτα δὲ καὶ νῦν ἔχουσιν ἓνια ζῶα.
 10 πᾶσαι ἄρα αἱ αἰσθήσεις ἔχονται ὑπὸ τῶν μὴ
 ἀτελῶν μηδὲ πεπηρωμένων· φαίνεται γὰρ καὶ ἡ
 σπάλαξ ὑπὸ τὸ δέρμα ἔχουσα ὀφθαλμούς. ὥστ'
 εἰ μὴ τι ἕτερόν ἐστι σῶμα, καὶ πάθος ὃ μηθενός
 ἐστι τῶν ἐνταῦθα σωμαμάτων, οὐδεμία ἂν ἐκλίποι
 αἰσθησις.

Ἄλλὰ μὴν οὐδὲ τῶν κοινῶν οἷόν τ' εἶναι αἱ
 15 σθητήριόν τι ἴδιον, ὣν ἐκάστη αἰσθήσει αἰσθανο-
 μεθα κατὰ συμβεβηκός, οἷον κινήσεως, στάσεως,
 σχήματος, μεγέθους, ἀριθμοῦ, ἐνός· ταῦτα γὰρ
 πάντα κινήσει αἰσθανόμεθα, οἷον μέγεθος κινήσει.
 ὥστε καὶ σχῆμα· μέγεθος γάρ τι τὸ σχῆμα. τὸ
 δ' ἡρεμοῦν τῷ μὴ κινεῖσθαι· ὃ δ' ἀριθμός τῇ ἀπο-
 20 φάσει τοῦ συνεχοῦς καὶ τοῖς ἰδίοις· ἐκάστη γὰρ
 ἐν αἰσθάνεται αἰσθησις. ὥστε δῆλον ὅτι ἀδύνατον
 ὁπουοῦν ἰδίαν αἰσθησιν εἶναι τούτων, οἷον κινή-
 σεως· οὕτω γὰρ ἔσται ὥσπερ νῦν τῇ ὄψει τὸ
 γλυκὺ αἰσθανόμεθα. τοῦτο δ' ὅτι ἀμφοῖν ἔχοντες
 τυγχάνομεν αἰσθησιν, ἣ καὶ ὅταν συμπέσωσιν ἀνα-
 γνωρίζομεν· εἰ δὲ μή, οὐδαμῶς ἂν ἀλλ' ἢ κατὰ

^a This is the conclusion to which all the preceding arguments lead.

^b i.e. when and because they move.

^c When a thing is "continuous" it is "one," which in the Greek mind was not a number.

^d A. is definitely wrong here. We do not "perceive" sweetness by sight; we may assume sweetness by association

ON THE SOUL, III. 1.

organ of air, while the organ of smell is composed of one or other of these). But fire is the medium of no perception, or else is common to them all (for there is no possibility of perception without heat), and earth is the medium of no sense perception, or else is connected with a sense of touch in a special way. So we are left to suppose that there is no sense organ apart from water and air ; and some animals actually have organs composed of these ; ^a the conclusion is that all the senses are possessed by all such animals as are neither undeveloped nor maimed ; even the mole seems to have eyes under the skin. If then there is no other body, and no other property which belongs to any of the bodies in the world, there can be no sense perception omitted from our list.

But, again, it is impossible that there should be a special sense organ to perceive common sensibles, which we perceive incidentally by each sense, such, I mean, as motion, rest, shape, magnitude, number and unity ; for we perceive all these things by movement ; ^b for instance we perceive magnitude by movement, and shape also ; for shape is a form of magnitude. We perceive rest by absence of movement ; number is perceived by absence of continuity, ^c and by the special senses ; for each sense perceives one thing. So that it is clearly impossible for there to be any special sense of any one of these things, such as movement ; if there were, it would be in the same way as we now perceive sweetness by sight. ^d But this is because we happen to have perception of both, whereby we recognize them when they occur together, otherwise we should never per-

The perception of common sensibles.

of ideas, or infer it in some other way, but we do not perceive it.

425 a

25 συμβεβηκὸς ἡσθανόμεθα, οἷον τὸν Κλέωνος υἱὸν οὐχ ὅτι Κλέωνος υἱός, ἀλλ' ὅτι λευκός· τούτῳ δὲ συμβεβηκεν υἱῷ Κλέωνος εἶναι. τῶν δὲ κοινῶν ἡδὴ ἔχομεν αἰσθησιν κοινήν, οὐ κατὰ συμβεβηκός· οὐκ ἄρ' ἐστὶν ἰδία· οὐδαμῶς γὰρ ἂν ἡσθανόμεθα ἀλλ'

80 ἢ οὕτως ὥσπερ εἴρηται τὸν Κλέωνος υἱὸν ἡμᾶς ὁρᾶν. τὰ δ' ἀλλήλων ἴδια κατὰ συμβεβηκὸς αἰσθάνονται αἱ αἰσθήσεις, οὐχ ἡ αἱ αὐταί, ἀλλ' ἡ

425 b μία, ὅταν ἅμα γένηται ἡ αἰσθησις ἐπὶ τοῦ αὐτοῦ, οἷον χολήν ὅτι πικρὰ καὶ ξανθή· οὐ γὰρ δὴ ἐτέρας γε τὸ εἰπεῖν ὅτι ἄμφω ἔν· διὸ καὶ ἀπατᾶται, καὶ ἐὰν ἡ ξανθόν, χολήν οἶεται εἶναι. ζητήσεις δ' ἂν

5 τις τίνος ἔνεκα πλείους ἔχομεν αἰσθήσεις, ἀλλ' οὐ μίαν μόνην. ἡ ὅπως ἡττον λανθάνη τὰ ἀκολουθοῦντα καὶ κοινά, οἷον κίνησις καὶ μέγεθος καὶ ἀριθμός· εἰ γὰρ ἦν ἡ ὄψις μόνη, καὶ αὕτη¹ λευκοῦ, ἐλάνθανεν ἂν μᾶλλον καὶ ἐδόκει ταῦτό εἶναι πάντα διὰ τὸ ἀκολουθεῖν ἀλλήλοις ἅμα χρῶμα καὶ

10 μέγεθος. νῦν δ' ἐπεὶ καὶ ἐν ἐτέρῳ αἰσθητῷ τὰ κοινὰ ὑπάρχει, δῆλον ποιεῖ ὅτι ἄλλο τι ἕκαστον αὐτῶν.

II. Ἐπεὶ δ' αἰσθανόμεθα ὅτι ὁρῶμεν καὶ ἀκούομεν, ἀνάγκη ἡ τῇ ὄψει αἰσθάνεσθαι ὅτι ὁρᾷ, ἡ ἐτέρα. ἀλλ' ἡ αὕτη ἔσται τῆς ὄψεως καὶ τοῦ

15 ὑποκειμένου χρώματος. ὥστε ἡ δύο τοῦ αὐτοῦ ἔσονται ἡ αὕτη αὐτῆς. ἔτι δ' εἰ καὶ ἐτέρα εἴη ἡ² τῆς ὄψεως αἰσθησις, ἡ εἰς ἄπειρον εἰσιν ἡ αὕτη

¹ αὕτη B.² om. ἡ B.

ON THE SOUL, III. I.—II.

ceive them except incidentally ; for instance we perceive Cleon's son, not because he is Cleon's son, but because he is white ; his being Cleon's son is merely incidental. We have then a common sense which apprehends common sensibles, not incidentally ; and it is not a special sense. If there were such, we should never perceive in any other way, except as we said that we saw Cleon's son. But the senses do perceive each other's proper objects incidentally, not in their own identity, but acting together as one, when sensation occurs simultaneously in the case of the same object, as for instance of bile, that it is bitter and yellow ; for saying that both are one is not attributing it to another sense ; and so the sense can be deceived, and, if an object is yellow, thinks that it is bile. One might ask why we have several senses and not one only. It may be in order that the accompanying and common properties, such as movement, magnitude and number should escape us less ; for if vision were our only sense, and it perceived something white, there would be more room for error, and colour and magnitude would appear to be the same thing, because they accompany each other. But, as it is, since the common sensibles exist in a second object, it becomes clear that each of them is something separate.

II. But since we are conscious that we see and hear, either sight itself must perceive that it sees, or some other sense. But in the former case the same sense must perceive both sight and colour, the proper object of sight. So that either two senses perceive the same object, or sight perceives itself. Again, if there is a separate sense perceiving sight, either the process will go on *ad infinitum*, or a sense must per-

How do we
know that
we see ?

τις ἔσται αὐτῆς. ὥστ' ἐπὶ τῆς πρώτης τοῦτο ποιητέον. ἔχει δ' ἀπορίαν· εἰ γὰρ τὸ τῇ ὄψει αἰσθάνεσθαι ἔστιν ὁρᾶν, ὁρᾶται δὲ χρῶμα ἢ τὸ ἔχον, εἰ ὄψεταί τις τὸ ὁρῶν, καὶ χρῶμα ἔξει τὸ ὁρῶν πρῶτον. φανερόν τοίνυν ὅτι οὐχ ἓν τὸ τῇ ὄψει αἰσθάνεσθαι· καὶ γὰρ ὅταν μὴ ὁρῶμεν, τῇ ὄψει κρίνομεν καὶ τὸ σκοτός καὶ τὸ φῶς, ἀλλ' οὐχ ὡσαύτως. ἔτι δὲ καὶ τὸ ὁρῶν ἔστιν ὡς κε-
 20 χρωμάτισται· τὸ γὰρ αἰσθητήριον δεκτικὸν τοῦ αἰσθητοῦ ἄνευ τῆς ὕλης ἕκαστον. διὸ καὶ ἀπ-
 25 ελθόντων τῶν αἰσθητῶν ἔνεισιν αἱ αἰσθήσεις καὶ φαντασίαι ἐν τοῖς αἰσθητηρίοις.

Ἡ δὲ τοῦ αἰσθητοῦ ἐνέργεια καὶ τῆς αἰσθήσεως ἡ αὐτὴ μὲν ἐστὶ καὶ μία, τὸ δ' εἶναι οὐ ταυτὸν αὐταῖς· λέγω δ' οἷον ψόφος ὁ κατ' ἐνέργειαν καὶ ἀκοὴ ἡ κατ' ἐνέργειαν· ἔστι γὰρ ἀκοὴν ἔχοντα μὴ ἀκούειν, καὶ τὸ ἔχον ψόφον οὐκ ἀεὶ ψοφεῖ.
 30 ὅταν δ' ἐνεργῇ τὸ δυνάμενον ἀκούειν καὶ ψοφῇ τὸ δυνάμενον ψοφεῖν, τότε ἡ κατ' ἐνέργειαν ἀκοὴ
 428 a ἅμα γίνεται καὶ ὁ κατ' ἐνέργειαν ψόφος, ὦν εἴπειεν ἂν τις τὸ μὲν εἶναι ἀκουσιν τὸ δὲ ψόφησιν.

Εἰ δ' ἔστιν ἡ κίνησις καὶ ἡ ποίησις καὶ τὸ πάθος ἐν τῷ ποιουμένῳ, ἀνάγκη καὶ τὸν ψόφον καὶ τὴν ἀκοὴν τὴν κατ' ἐνέργειαν ἐν τῇ κατὰ δύναμιν
 5 εἶναι· ἡ γὰρ τοῦ ποιητικοῦ καὶ κινητικοῦ ἐνέργεια ἐν τῷ πάσχοντι ἐγγίνεται. διὸ οὐκ ἀνάγκη τὸ κινεῖν κινεῖσθαι. ἡ μὲν οὖν τοῦ ψοφητικοῦ ἐνέρ-
 γειά ἐστὶ ψόφος ἢ ψόφησις, ἡ δὲ τοῦ ἀκουστικοῦ

^a If we suppose a special sense to apprehend that we see, we must suppose another to apprehend this and so on.

^b Cf. ch. viii.

ON THE SOUL, III. II.

ceive itself.^a So we may assume that it occurs with the first sense. But here is a difficulty ; for if perception by vision is seeing, and that which is seen either is colour or has colour, then if anyone sees that which sees, it follows that what primarily sees will possess colour. It is therefore obvious that the phrase "perceiving by vision" has not merely one meaning ; for, even when we do not see, we judge both darkness and light by vision, but not in the same way. Moreover that which sees does in a sense possess colour ; for each sense organ is receptive of the perceived object, but without its matter. So that even when the objects of perception are absent, perception and mental pictures are present in the sense organ.

But the activity of the object felt and of the sensation are one and the same thing,^b though their actual essence is not the same ; by saying that they are the same, I mean the sound actively and the hearing actively ; for it is possible for one who possesses hearing not to hear, and that which has sound is not always sounding. But when that which has the power of hearing is exercising its power, and that which can sound is sounding, then the active hearing and the active sound occur together, of which one may call one hearing and one sounding.

If then the movement, that is, the acting and being acted upon, takes place in that which is acted upon, then the sound and the hearing in a state of activity must reside in the potential hearing ; for the activity of what is moving and active takes place in what is being acted upon. Hence that which causes motion need not be moved. The activity, then, of the object producing sound is sound, or sounding, and of that

What is
sensation?

ἀκοή ἢ ἄκουσις· διττὸν γὰρ ἢ ἀκοή, καὶ διττὸν ὁ
 ψόφος. ὁ δ' αὐτὸς λόγος καὶ ἐπὶ τῶν ἄλλων
 αἰσθήσεων καὶ αἰσθητῶν. ὥσπερ γὰρ ἢ ποιήσις
 10 καὶ ἢ πάθησις ἐν τῷ πάσχοντι ἄλλ' οὐκ ἐν τῷ
 ποιῶντι, οὕτω καὶ ἢ τοῦ αἰσθητοῦ ἐνέργεια καὶ
 ἢ τοῦ αἰσθητικοῦ ἐν τῷ αἰσθητικῷ. ἀλλ' ἐπ'
 ἐνίων μὲν ὠνόμασται, οἷον ἢ ψόφησις καὶ ἢ
 ἄκουσις, ἐπὶ δ' ἐνίων ἀνώνυμον θάτερον· ὅρασις
 γὰρ λέγεται ἢ τῆς ὀψεως ἐνέργεια, ἢ δὲ τοῦ
 15 χρώματος ἀνώνυμος, καὶ γεῦσις ἢ τοῦ γευστικοῦ,
 ἢ δὲ τοῦ χυμοῦ ἀνώνυμος. ἐπεὶ δὲ μία μὲν ἐστὶν
 ἐνέργεια ἢ τοῦ αἰσθητοῦ καὶ ἢ τοῦ αἰσθητικοῦ,
 τὸ δ' εἶναι ἕτερον, ἀνάγκη ἅμα φθείρεσθαι καὶ
 σώζεσθαι τὴν οὕτω λεγομένην ἀκοήν καὶ ψόφον,
 καὶ χυμὸν δὴ καὶ γεῦσιν καὶ τὰ ἄλλα ὁμοίως·
 20 τὰ δὲ κατὰ δύνάμιν λεγόμενα οὐκ ἀνάγκη, ἀλλ'
 οἱ πρότερον φυσιολόγοι τοῦτο οὐ καλῶς ἔλεγον,
 οὐθὲν οἰόμενοι οὔτε λευκὸν οὔτε μέλαν εἶναι ἄνευ
 ὀψεως, οὐδὲ χυμὸν ἄνευ γεύσεως. τῇ μὲν γὰρ
 ἔλεγον ὀρθῶς, τῇ δ' οὐκ ὀρθῶς· διχῶς γὰρ λεγο-
 μένης τῆς αἰσθήσεως καὶ τοῦ αἰσθητοῦ, τῶν μὲν
 25 κατὰ δύνάμιν τῶν δὲ κατ' ἐνέργειαν, ἐπὶ τούτων
 μὲν συμβαίνει τὸ λεχθέν, ἐπὶ δὲ τῶν ἐτέρων οὐ
 συμβαίνει. ἀλλ' ἐκεῖνοι ἀπλῶς ἔλεγον περὶ τῶν
 λεγομένων οὐχ ἀπλῶς.

Εἰ δ' ἡ συμφωνία φωνή τίς ἐστίν, ἢ δὲ φωνή
 καὶ ἡ ἀκοή ἐστίν ὥς ἓν ἐστὶ καὶ ἐστὶν ὥς οὐχ ἓν
 τὸ αὐτό, λόγος δ' ἢ συμφωνία, ἀνάγκη καὶ τὴν
 30 ἀκοήν λόγον τινὰ εἶναι. καὶ διὰ τοῦτο καὶ φθείρει

^a If a red object is in the dark it does not appear red. Some philosophers maintained that it is not red, and that

ON THE SOUL, III. II.

producing hearing is hearing or audition, for hearing is used in two senses, and so is sound. The same argument applies to the case of other senses and sensible objects. For just as acting and being acted upon resides in that which is acted upon, and not that which acts, so also the activity of the object perceived and of the percipient lies in the percipient. In some cases we have names for both, such as sounding and hearing, but in others one of the terms has no name; for the activity of vision is called seeing, but that of colour has no name; the activity of taste is called tasting, but that of flavour has no name. But since the activity of the perceived and of the percipient are the same, though their essence is different, it necessarily follows that what is called hearing must be destroyed and preserved at the same time as sound, and so with flavour and taste and the rest; but this does not apply to things potential, though the earlier natural philosophers did not understand this, supposing that white and black had no existence without vision, nor flavour without taste.^a In one sense they were right, but in another wrong; for sensation and the sensible object being used in two senses, that is potentially and actually, their statements apply to the latter class, but not to the former. In other words, they were speaking in one sense about terms which are used in two.

If, then, harmony is a voice of some kind (and voice and hearing are in one sense one and the same, and in another not), and if harmony is a ratio, then it follows that hearing is in some sense a ratio. That

Sensation
as a
harmony.

"red" has no existence except when we see it. A. argues that such an object is "potentially" red, because, given the right conditions, it will appear red.

426 a

ἕκαστον ὑπερβάλλον, καὶ τὸ ὀξύ καὶ τὸ βαρύ, τὴν

426 b

ἀκοήν· ὁμοίως δὲ καὶ ἐν χυμοῖς τὴν γεῦσιν, καὶ
ἐν χρώμασι τὴν ὄψιν τὸ σφόδρα λαμπρὸν ἢ
ζοφερόν, καὶ ἐν ὁσφρήσει ἢ ἰσχυρὰ ὁσμὴ καὶ
γλυκεῖα καὶ πικρά, ὡς λόγου τινὸς ὄντος τῆς
αἰσθήσεως. διὸ καὶ ἡδέα μὲν, ὅταν εἰλικρινῇ καὶ
ἀμιγῇ ἄγεται εἰς τὸν λόγον, οἷον τὸ ὀξύ ἢ γλυκὺ
ἢ ἄλμυρόν· ἡδέα γὰρ τότε. ὅλως δὲ μᾶλλον τὸ
μικτὸν συμφωνία ἢ τὸ ὀξύ ἢ βαρύ, ἀφ᾽ ἧς δὲ τὸ
θερμαντὸν ἢ ψυκτόν· ἢ δ' αἰσθησις ὁ λόγος·
ὑπερβάλλοντα δὲ λυπεῖ ἢ φθείρει.

Ἐκάστη μὲν οὖν αἰσθησις τοῦ ὑποκειμένου
αἰσθητοῦ ἐστίν, ὑπάρχουσα ἐν τῷ αἰσθητηρίῳ ἢ
10 αἰσθητήριον, καὶ κρίνει τὰς τοῦ ὑποκειμένου αἰ-
σθητοῦ διαφοράς, οἷον λευκὸν μὲν καὶ μέλαν ὄψις,
γλυκὺ δὲ καὶ πικρὸν γεῦσις. ὁμοίως δ' ἔχει τοῦτο
καὶ ἐπὶ τῶν ἄλλων. ἐπεὶ δὲ καὶ τὸ λευκὸν καὶ
τὸ γλυκὺ καὶ ἕκαστον τῶν αἰσθητῶν πρὸς ἕκαστον
κρίνομεν, τίνι καὶ αἰσθανόμεθα ὅτι διαφέρει;
15 ἀνάγκη δὴ αἰσθήσει· αἰσθητὰ γὰρ ἐστίν. ἢ καὶ
δῆλον ὅτι ἡ σὰρξ οὐκ ἔστι τὸ ἔσχατον αἰσθητήριον·
ἀνάγκη γὰρ ἦν ἀπτόμενον αὐτοῦ κρίνειν τὸ κρῖνον.
οὔτε δὴ κεχωρισμένοις ἐνδέχεται κρίνειν ὅτι ἕτερον
τὸ γλυκὺ τοῦ λευκοῦ, ἀλλὰ δεῖ ἐνί τινι ἄμφω δῆλα
εἶναι. οὕτω μὲν γὰρ καὶ εἰ τοῦ μὲν ἐγὼ τοῦ δὲ
20 σὺ αἰσθοιο, δῆλον ἂν εἴη ὅτι ἕτερα ἀλλήλων. δεῖ
δὲ τὸ ἐν λέγειν ὅτι ἕτερον· ἕτερον γὰρ τὸ γλυκὺ
τοῦ λευκοῦ. λέγει ἄρα τὸ αὐτό, ὥστε, ὡς λέγει,

ON THE SOUL, III. II.

is why both high and low pitch, if excessive, destroy hearing ; in the same way in flavours excess destroys taste, and in colours the over-brilliant or over-dark destroys vision, and in smelling, the strong scent, whether sweet or bitter, destroys smell, because sensation is some kind of harmony. That is also why things are pleasant when they are brought into the proportion pure and unmixed, such as acid, sweet or salt ; for in that case they are pleasant. But generally speaking a mixed constitution produces a better harmony than the high or low pitch, and to the touch the warm is more pleasurable than the cold ; but perception is a proportion, and excess hurts or destroys.

Each sensation then relates to the subject perceived, existing in the sense organ as such, and judges differences in the subject perceived ; for instance, vision discriminates between white and black, and taste between sweet and bitter. And the same process occurs in all other cases. But, since we distinguish white and sweet, and compare all objects perceived with each other, by what sense do we perceive that they differ ? It must evidently be by some sense that we perceive the difference ; for they are objects of sense. Incidentally it becomes clear that flesh is not the ultimate sense organ ; for, if it were, judgement would depend on being in contact. Nor, again, is it possible to judge that sweet and white are different by separate senses, but both must obviously be determined by one sense. For, in the other case, if you perceived one thing and I another, it would be obvious that they differed from each other. It can only be one thing which declares the difference ; for sweet differs from white. The same faculty, then, makes this statement so that, just as it speaks, so

How do we
apprehend
the differ-
ences
between the
objects of
different
senses ?

426 b

οὕτω καὶ νοεῖ καὶ αἰσθάνεται. ὅτι μὲν οὖν οὐχ
οἷόν τε κεχωρισμένοις κρίνειν τὰ κεχωρισμένα,
δηλον· ὅτι δ' οὐδ' ἐν κεχωρισμένῳ χρόνῳ, ἐντεῦθεν.

25 ὥσπερ γὰρ τὸ αὐτὸ λέγει ὅτι ἕτερον τὸ ἀγαθὸν
καὶ τὸ κακόν, οὕτω καὶ ὅτε θάτερον λέγει ὅτι
ἕτερον, καὶ θάτερον οὐ κατὰ συμβεβηκὸς τὸ ὅτε
(λέγω δ', οἷον νῦν λέγω ὅτι ἕτερον, οὐ μέντοι ὅτι
νῦν ἕτερον). ἀλλ' οὕτω λέγει, καὶ νῦν, καὶ ὅτι
νῦν· ἅμα ἄρα. ὥστε ἀχώριστον καὶ ἐν ἀχωρίστῳ
30 χρόνῳ. ἀλλὰ μὴν ἀδύνατον ἅμα τὰς ἐναντίας
κινήσεις κινεῖσθαι τὸ αὐτὸ ἢ ἀδιαίρετον καὶ ἐν
ἀδιαίρετῳ χρόνῳ. εἰ γὰρ τὸ γλυκὺ ὡδὶ κινεῖ τὴν

427 a

αἰσθησιν ἢ τὴν νόησιν, τὸ δὲ πικρὸν ἐναντίως,
καὶ τὸ λευκὸν ἐτέρως. ἀρ' οὖν ἅμα μὲν καὶ
ἀριθμῷ ἀδιαίρετον καὶ ἀχώριστον τὸ κρῖνον, τῷ
εἶναι δὲ κεχωρισμένον; ἔστι δὴ πως ὥς τὸ δι-
αιρετὸν τῶν διηρημένων αἰσθάνεται, ἔστι δ' ὥς ἢ
6 ἀδιαίρετον· τῷ εἶναι μὲν γὰρ διαιρετόν, τόπῳ δὲ
καὶ ἀριθμῷ ἀδιαίρετον. ἢ οὐχ οἷόν τε; δυνάμει
μὲν γὰρ τὸ αὐτὸ καὶ ἀδιαίρετον τὰναντία, τῷ δ'
εἶναι οὐ, ἀλλὰ τῷ ἐνεργεῖσθαι διαιρετόν, καὶ οὐχ
οἷόν τε ἅμα λευκὸν καὶ μέλαν εἶναι. ὥστ' οὐδὲ
τὰ εἶδη πᾶσχειν αὐτῶν, εἰ τοιοῦτον ἢ αἰσθησις
10 καὶ ἡ νόησις, ἀλλ' ὥσπερ ἦν καλοῦσί τινες στιγμὴν,
ἢ μία καὶ ἢ δύο, ταύτῃ καὶ διαιρετῇ. ἢ μὲν οὖν
ἀδιαίρετον, ἐν τὸ κρῖνόν ἐστι καὶ ἅμα, ἢ δὲ

ON THE SOUL, III. II.

does it judge and perceive. It is quite evident that it is impossible to pass judgement on separate objects by separate faculties ; and it is also obvious that they are not judged at separate times from the following considerations. For just as the same faculty declares that good and evil are different, so also when it declares that one thing is different from another thing, the " time when " is not merely incidental (in the sense, that is, that I now say that there is a difference, but not that I say that there is now a difference). But the faculty says now, and also that the difference is now, and both statements are true at once. So the judging sense must be inseparable, and also must judge without an interval. But, again, it is impossible that the same faculty should be moved in opposite directions at the same time, in so far as it is undivided, and in undivided time. For if the sweet promotes sensation or understanding in one direction, and bitter in the opposite, white moves it in a different direction altogether. Are we, then, to suppose that the judging faculty is numerically indivisible and inseparable, but is divided in essence ? It is, then, in its divisible nature that it perceives divided things, and it is otherwise indivisible. For it is divisible in essence, but indivisible spatially and numerically. Or is this impossible ? For the same thing, then, becomes indivisible potentially, but not in essence, but divisible actually ; but it is impossible for anything to be black and white at the same time. So that the forms of these things are not affected, if sensation and understanding are of this kind. But just as some men speak of a point as both one and two, in this sense the point is divisible. In so far, then, as the judging faculty is indivisible, it is one

427 a

διαιρετὸν ὑπάρχει, δις τῷ αὐτῷ χρῆται σημείῳ ἅμα. ἥ μὲν οὖν δυσὶ χρῆται τῷ πέρατι, δύο κρίνει, καὶ κεχωρισμένα ἐστὶν ὡς κεχωρισμένῳ¹.

15 ἥ δ' ἐν, ἐνὶ καὶ ἅμα.

Περὶ μὲν οὖν τῆς ἀρχῆς ἥ φαμὲν τὸ ζῶον αἰσθητικὸν εἶναι, διωρίσθω τὸν τρόπον τοῦτον.

III. Ἐπεὶ δὲ δύο διαφοραῖς ὀρίζονται μάλιστα τὴν ψυχὴν, κινήσει τε τῇ κατὰ τόπον καὶ τῷ νοεῖν καὶ τῷ κρίνειν καὶ αἰσθάνεσθαι, δοκεῖ δὲ καὶ τὸ

20 νοεῖν καὶ τὸ φρονεῖν ὥσπερ αἰσθάνεσθαι τι εἶναι· ἐν ἀμφοτέροις γὰρ τούτοις κρίνει τι ἢ ψυχὴ καὶ γνωρίζει τῶν ὄντων, καὶ οἱ γε ἀρχαῖοι τὸ φρονεῖν καὶ τὸ αἰσθάνεσθαι ταῦτόν εἶναί φασιν, ὥσπερ καὶ Ἐμπεδοκλῆς εἶρηκε “πρὸς παρεὸν γὰρ μῆτις ἀέξεται ἀνθρώποισιν” καὶ ἐν ἄλλοις “ὅθεν σφίσιν

25 αἰεὶ καὶ τὸ φρονεῖν ἄλλοῖα παρίσταται.” τὸ δ' αὐτὸ τούτοις βούλεται καὶ τὸ Ὀμήρου “τοῖος γὰρ νόος ἐστίν.” πάντες γὰρ οὗτοι τὸ νοεῖν σωματικὸν ὥσπερ τὸ αἰσθάνεσθαι ὑπόλαμβάνουσιν, καὶ αἰσθάνεσθαι τε καὶ φρονεῖν τῷ ὁμοίῳ τὸ ὅμοιον, ὥσπερ καὶ ἐν τοῖς κατ' ἀρχὰς λόγοις διωρίσαμεν.

427 b

καίτοι ἔδει ἅμα καὶ περὶ τοῦ ἡπατῆσθαι αὐτοὺς λέγειν· οἰκειότερον γὰρ τοῖς ζώοις, καὶ πλείω χρόνον ἐν τούτῳ διατελεῖ ἡ ψυχὴ. διὸ ἀνάγκη ἦτοι ὥσπερ ἔνιοι λέγουσι, πάντα τὰ φαινόμενα εἶναι ἀληθῆ, ἥ τὴν τοῦ ἀνομοίου θίξιν ἀπάτην
8 εἶναι· τοῦτο γὰρ ἐναντίον τῷ τῷ ὁμοίῳ τὸ ὅμοιον γνωρίζειν· δοκεῖ δὲ καὶ ἡ ἀπάτη καὶ ἡ ἐπιστήμη

¹ κεχωρισμένων B.

^a Od. xviii. 136.

^b Bk. I, ch. 2.

ON THE SOUL, III. II.—III.

and instantaneous in action ; but in so far as it is divisible, it uses the same symbol twice at the same time. In so far, then, as it treats a limit as two things it passes judgement on two, and judges of two distinct things in its capacity as distinct ; but in so far as it judges of it as only one, it judges by one faculty and at one time.

Concerning the principle in virtue of which we call the living creature sensible, enough has been said.

III. But since men generally define the soul by two different faculties, movement in space on the one hand, and thinking, judging and perceiving on the other, they would seem to suppose that thinking and considering are forms of perception ; for in both cases the soul in a sense judges and has cognisance of what exists, and the older philosophers actually assert that thinking and perceiving are identical. For instance Empedocles has said, "Judgement will grow with a man according to what appears to him," and in another passage "whence their thinking continually appears to them in different forms." Homer's phrase, again, "Such is the nature of man's thought"^a implies the same thing. For all these authors suppose the process of thinking to be a bodily function like perception, and that men both perceive and recognize like by like, as we have explained at the beginning of this treatise.^b And yet they ought to have made some mention of error at the same time ; for error seems to be more natural to living creatures, and the soul spends more time in it. From this belief it will follow, as some say, that all things which appear to man are true, or that error is contact with the unlike ; for this is the opposite to recognizing like by like ; but it appears that error and knowledge

Relation
between
sensation
and
thinking.

τῶν ἐναντίων ἢ αὐτὴ εἶναι. ὅτι μὲν οὖν οὐ ταύ-
 τόν ἐστι τὸ αἰσθάνεσθαι καὶ τὸ φρονεῖν, φανερόν·
 τοῦ μὲν γὰρ πᾶσι μέτεστι, τοῦ δὲ ὀλίγοις τῶν
 ζώων. ἀλλ' οὐδὲ τὸ νοεῖν, ἐν ᾧ ἐστὶ τὸ ὀρθῶς
 10 καὶ τὸ μὴ ὀρθῶς, τὸ μὲν ὀρθῶς φρόνησις καὶ
 ἐπιστήμη καὶ δόξα ἀληθῆς, τὸ δὲ μὴ ὀρθῶς
 τὰναντία τούτων· οὐδὲ τοῦτο ἐστὶ ταυτό τῷ
 αἰσθάνεσθαι· ἢ μὲν γὰρ αἰσθησις τῶν ἰδίων αἰ-
 ἀληθῆς, καὶ πᾶσιν ὑπάρχει τοῖς ζώοις, διανοεῖσθαι
 δ' ἐνδέχεται καὶ ψευδῶς, καὶ οὐδενὶ ὑπάρχει ᾧ
 15 μὴ καὶ λόγος· φαντασία γὰρ ἕτερον καὶ αἰσθήσεως
 καὶ διανοίας· αὐτὴ τε οὐ γίγνεται ἄνευ αἰσθή-
 σεως, καὶ ἄνευ ταύτης οὐκ ἔστιν ὑπόληψις. ὅτι
 δ' οὐκ ἔστιν ἢ αὐτὴ νόησις καὶ ὑπόληψις, φανερόν.
 τοῦτο μὲν γὰρ τὸ πάθος ἐφ' ἡμῖν ἐστίν, ὅταν
 βουλώμεθα (πρὸ ὁμμάτων γὰρ ἔστι ποιήσασθαι,
 20 ὥσπερ οἱ ἐν τοῖς μνημονικοῖς τιθέμενοι καὶ εἰδωλο-
 ποιοῦντες), δοξάζειν δ' οὐκ ἐφ' ἡμῖν· ἀνάγκη γὰρ
 ἢ ψεύδεσθαι ἢ ἀληθεύειν. ἔτι δὲ ὅταν μὲν δοξά-
 σωμεν δεινόν τι ἢ φοβερόν, εὐθύς συμπάσχομεν,
 ὁμοίως δὲ καὶ θαρραλέον· κατὰ δὲ τὴν φαντασίαν
 ὡσαύτως ἔχομεν ὥσπερ ἂν οἱ θεώμενοι ἐν γραφῇ
 25 τὰ δεινὰ ἢ θαρραλέα. εἰσὶ δὲ καὶ αὐτῆς τῆς
 ὑπολήψεως διαφοραί, ἐπιστήμη καὶ δόξα καὶ
 φρόνησις καὶ τὰναντία τούτων, περὶ ὧν τῆς δια-
 φορᾶς ἕτερος ἔστω λόγος.

Περὶ δὲ τοῦ νοεῖν, ἐπεὶ ἕτερον τοῦ αἰσθάνεσθαι,
 τούτου δὲ τὸ μὲν φαντασία δοκεῖ εἶναι τὸ δὲ

* In normal cases if a man sees a red object, it is red.

ON THE SOUL, III. III.

in the case of opposites are the same. Now it is quite clear that the processes of feeling and thinking are not the same ; for all living creatures have a share in the former, but only a few in the latter. Nor is it right to suppose that in thinking, which may be divided into correct and incorrect thinking, correct thinking is wisdom and knowledge and true opinion, and that incorrect thinking is the opposite of these ; nor is this the same thing as perceiving ; for the perception of individual things is always true,^a and is a characteristic of all living creatures, but it is possible to think falsely, and this belongs to no animal which has not reasoning power ; for imagination is different both from perception and thought ; imagination does not occur without perception, and without imagination there is no belief. But that thinking and believing are not identical is obvious. For the former is an affection which lies in our power whenever we choose (for it is possible to put things before our eyes, just as those do who invent mnemonics and construct images), but it is not in our power to form opinions as we will ; for we must either hold a false opinion or a true one. Again, when we form an opinion that something is threatening or frightening, we are immediately affected by it, and the same is true of our opinion of something that inspires courage ; but in imagination we are like spectators looking at something dreadful or encouraging in a picture. There are also differences in belief itself, knowledge, opinion, thinking, and their opposites, but these differences must be the subject of another discussion.^b

As for thought, since it is distinct from perception, and is held to include both imagination and belief, it

Imagination.

^b ? *Eth. Nic.* 1139 b 15.

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ὑπόληψις, περὶ φαντασίας διορίσαντας οὕτω περὶ
 428 a θατέρου λεκτέον. εἰ δὴ ἐστὶν ἡ φαντασία καθ'
 ἣν λέγομεν φάντασμά τι ἡμῖν γίνεσθαι καὶ μὴ
 εἶ τι κατὰ μεταφορὰν λέγομεν, μία τίς ἐστι τού-
 των δύναμις ἢ ἕξις, καθ' ἣν κρίνομεν καὶ ἀλη-
 θεύομεν ἢ ψευδόμεθα. τοιαῦται δ' εἰσὶν αἰσθησις,
 ἰδόξα, ἐπιστήμη, νοῦς. ὅτι μὲν οὖν οὐκ ἔστιν
 αἰσθησις, δῆλον ἐκ τῶνδε. αἰσθησις μὲν γὰρ ἥτοι
 δύναμις ἢ ἐνέργεια, οἷον ὄψις καὶ ὄρασις, φαίνεται
 δέ τι καὶ μηδετέρου ὑπάρχοντος τούτων, οἷον τὰ
 ἐν τοῖς ὕπνοις. εἴτα αἰσθησις μὲν ἀεὶ πάρεστι,
 φαντασία δ' οὐ. εἰ δὲ τῇ ἐνεργείᾳ τὸ αὐτό, πᾶσιν
 10 ἂν ἐνδέχοιτο τοῖς θηρίοις φαντασίαν ὑπάρχειν·
 δοκεῖ δ' οὐ, οἷον μύρμηκι ἢ μελίττῃ ἢ σκώληκι.
 εἴτα αἱ μὲν ἀληθεῖς αἰεὶ, αἱ δὲ φαντασίαι γίνονται
 αἱ πλείους ψευδεῖς. ἔπειτ' οὐδὲ λέγομεν, ὅταν
 ἐνεργῶμεν ἀκριβῶς περὶ τὸ αἰσθητόν, ὅτι φαίνεται
 τοῦτο ἡμῖν ἄνθρωπος· ἀλλὰ μᾶλλον ὅταν μὴ ἐν-
 15 αργῶς αἰσθανώμεθα. καὶ ὅπερ δὲ ἐλέγομεν πρό-
 τερον, φαίνεται καὶ μύουσιν ὀράματα. ἀλλὰ μὴν
 οὐδὲ τῶν ἀεὶ ἀληθευόντων οὐδεμία ἔσται, οἷον
 ἐπιστήμη ἢ νοῦς· ἔστι γὰρ φαντασία καὶ ψευδής.
 λείπεται ἄρα ἰδεῖν εἰ δόξα· γίνεται γὰρ δόξα καὶ
 20 ἀληθής καὶ ψευδής. ἀλλὰ δόξῃ μὲν ἔπεται πίστις
 (οὐκ ἐνδέχεται γὰρ δοξάζοντα οἷς δοκεῖ μὴ
 πιστεῦειν), τῶν δὲ θηρίων οὐθενὶ ὑπάρχει πίστις,
 φαντασία δὲ πολλοῖς. ἔτι πάσῃ μὲν δόξῃ ἀκο-
 λουθεῖ πίστις, πίσκει δὲ τὸ πεπεισθαι, πειθοῖ δὲ
 λόγος· τῶν δὲ θηρίων ἐνίοις φαντασία μὲν ὑπάρχει,
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will be best to discuss it after having completed our definition of imagination. If imagination is the process by which we say that an image is presented to us, and not anything which we call imagination metaphorically, it is one of those faculties or states of mind by which we judge and speak truly or falsely. Of this kind are sensation, opinion, knowledge and mind. It is clear from the following considerations that imagination is not sensation. Sensation is either potential or actual, such as either vision or seeing, but imagination occurs when neither of these is present, as when objects are seen in dreams. Secondly, sensation is always present but imagination is not. If sensation and imagination were identical in activity, then imagination would be possible for all wild animals ; and this appears not to be the case ; for instance it is not true of the ant, the bee, or the earthworm. Again, all sensations are true, but most imaginations are false. So we do not say when we are concerned with accurate observation of the sensible object that this seems to us to be a man ; but only when we do not perceive distinctly. And, as we have said before, things are seen by men even with their eyes shut. Nor is imagination one of the faculties which always speaks the truth, such as knowledge or mind ; for imagination may be false. It remains, then, to consider whether it is opinion ; for opinion may be either true or false. But conviction follows opinion (for one cannot hold opinions by which one is not convinced), but no animal has conviction, but many have imagination. Again, conviction is associated with every opinion, being persuaded with conviction, and reason with conviction ; but some wild animals have imagination, but none

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25 λόγος δ' οὐ. φανερόν τοίνυν ὅτι οὐδὲ δόξα μετ' αἰσθήσεως, οὐδὲ δι' αἰσθήσεως, οὐδὲ συμπλοκὴ δόξης καὶ αἰσθήσεως φαντασία ἂν εἴη, διὰ τε ταῦτα καὶ δῆλον ὅτι οὐκ ἄλλου τινός ἐστιν ἢ δόξα, ἀλλ' ἐκείνου ἐστὶν οὐ καὶ αἰσθησις· λέγω δ', ἐκ τῆς τοῦ λευκοῦ δόξης καὶ αἰσθήσεως ἢ
30 συμπλοκὴ φαντασία ἐστίν· οὐ γὰρ δὴ ἐκ τῆς δόξης

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μὲν τῆς τοῦ ἀγαθοῦ, αἰσθήσεως δὲ τῆς τοῦ λευκοῦ. τὸ οὖν φαίνεσθαι ἐστὶ τὸ δοξάζειν ὅπερ αἰσθάνεται μὴ κατὰ συμβεβηκός. φαίνεται δὲ καὶ ψευδῇ, περὶ ὧν ἅμα ὑπόληψιν ἀληθῇ ἔχει, οἷον φαίνεται μὲν ὁ ἥλιος ποδιαῖος, πεπίστευται δ' εἶναι μείζων
5 τῆς οἰκουμένης· συμβαίνει οὖν ἥτοι ἀποβεβλη- κέναι τὴν ἑαυτοῦ ἀληθῇ δόξαν, ἣν εἶχε, σωζομένου τοῦ πράγματος, μὴ ἐπιλαθόμενον μηδὲ μεταπει- σθέντα, ἢ εἰ ἔτι ἔχει, ἀνάγκη τὴν αὐτὴν ἀληθῇ εἶναι καὶ ψευδῇ. ἀλλὰ ψευδὴς ἐγένετο, ὅτε λάθοι μεταπεσὼν τὸ πρᾶγμα. οὐτ' ἄρα ἓν τι τούτων
10 ἐστὶν οὐτ' ἐκ τούτων ἢ φαντασία.

Ἄλλ' ἐπειδὴ ἐστὶ κινήθέντος τουδὶ κινεῖσθαι ἕτερον ὑπὸ τούτου, ἢ δὲ φαντασία κίνησις τις δοκεῖ εἶναι καὶ οὐκ ἄνευ αἰσθήσεως γίνεσθαι ἀλλ' αἰσθανομένοις καὶ ὧν αἰσθησις ἐστίν, ἔστι δὲ γίνεσθαι κίνησιν ὑπὸ τῆς ἐνεργείας τῆς αἰσθή- σεως, καὶ ταύτην ὁμοίαν ἀνάγκη εἶναι τῇ αἰσθήσει,
15 εἴη ἂν αὕτη ἢ κίνησις οὔτε ἄνευ αἰσθήσεως ἐνδε- χομένη οὔτε μὴ αἰσθανομένοις ὑπάρχειν, καὶ πολλὰ κατ' αὐτὴν καὶ ποιεῖν καὶ πάσχειν τὸ ἔχον, καὶ εἶναι καὶ ἀληθῇ καὶ ψευδῇ. τοῦτο δὲ συμβαίνει

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has reasoning power. It is clear, then, that neither does opinion exist in conjunction with perception, nor does it arise through perception, nor could imagination be a blending of opinion and sensation, and therefore it is clear that opinion is not concerned with anything else, but belongs to that to which sensation belongs ; I mean that imagination is a compound of an opinion of white with a sensation of white ; it could not be compounded of an opinion of good with a sensation of white. In that case imagination would be the forming of a direct opinion upon what we perceive not incidentally. But it is possible for things to have a false appearance about which we have a true belief ; for instance the sun appears to measure a foot across, but we are convinced that it is greater than the inhabited globe ; imagination appears, then, in this case either to have rejected the true opinion which it had, without any alteration in the thing itself, and without our forgetting or changing our minds, or, if we still hold our view, then the same opinion must be both true and false. A true opinion of course becomes false when we do not see that the facts have changed. Imagination, then, is not one of these things, nor a compound of them.

But since when a particular thing is moved another thing may be moved by it, and since imagination seems to be some kind of movement, and not to occur apart from sensation, but only to men when perceiving, and in connexion with what they perceive, and since movement is caused by the activity of sensation, and this activity must be similar to the sensation, this movement would be impossible without sensation, and could not exist in insentient beings, and in the light of it the possessor acts and is acted upon in many ways, and these effects may be both true and false. This occurs for the

The region
of error.

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διὰ τάδε. ἡ αἴσθησις τῶν μὲν ιδίων ἀληθὴς ἐστίν
 ἢ ὅτι ὀλίγιστον ἔχουσα τὸ ψεῦδος. δεύτερον δέ
 20 τοῦ συμβεβηκέναι ταῦτα· καὶ ἐνταῦθα ἤδη ἐνδέ-
 χεται διαψεύδεσθαι· ὅτι μὲν γὰρ λευκὸν, οὐ ψεύ-
 δεται, εἰ δὲ τοῦτο τὸ λευκὸν ἢ ἄλλο τι, ψεύδεται.
 τρίτον δὲ τῶν κοινῶν καὶ ἐπομένων τοῖς συμ-
 βεβηκόσιν, οἷς ὑπάρχει τὰ ἴδια· λέγω δ' οἷον
 κίνησις καὶ μέγεθος, ἃ συμβέβηκε τοῖς αἰσθητοῖς,
 25 περὶ ἃ μάλιστα ἤδη ἔστιν ἀπατηθῆναι κατὰ τὴν
 αἴσθησιν. ἡ δὲ κίνησις ἢ ὑπὸ τῆς ἐνεργείας γινο-
 μένη διοίσει τῆς αἰσθήσεως τῆς ἀπὸ τούτων τῶν
 τριῶν αἰσθήσεων. καὶ ἡ μὲν πρώτη παρούσης
 τῆς αἰσθήσεως ἀληθής, αἱ δ' ἕτεραι καὶ παρούσης
 καὶ ἀπούσης εἶεν ἂν ψευδεῖς, καὶ μάλιστα ὅταν
 30 πόρρω τὸ αἰσθητὸν ᾖ. εἰ οὖν μηθὲν μὲν ἄλλο
 429 a ἔχει τὰ εἰρημένα ἢ μὴ φαντασίαν, τοῦτο δ' ἐστὶ
 τὸ λεχθέν, ἡ φαντασία ἂν εἴη κίνησις ὑπὸ τῆς
 αἰσθήσεως τῆς κατ' ἐνέργειαν γιγνομένης. ἐπεὶ
 δ' ἡ ὄψις μάλιστα αἰσθησίς ἐστι, καὶ τὸ ὄνομα
 ἀπὸ τοῦ φάους εἴληφεν, ὅτι ἄνευ φωτὸς οὐκ ἔστιν
 5 ἰδεῖν. καὶ διὰ τὸ ἐμμένειν καὶ ὁμοίως εἶναι ταῖς
 αἰσθήσεσι, πολλὰ κατ' αὐτὰς πράττει τὰ ζῶα, τὰ
 μὲν διὰ τὸ μὴ ἔχειν νοῦν, οἷον τὰ θηρία, τὰ δὲ
 διὰ τὸ ἐπικαλύπτεσθαι τὸν νοῦν ἐνίοτε πάθει ἢ
 νόσοις ἢ ὑπνῷ, οἷον οἱ ἄνθρωποι. περὶ μὲν οὖν
 φαντασίας, τί ἐστὶ καὶ διὰ τί ἐστίν, εἰρήσθω ἐπὶ
 τοσοῦτον.

- 10 IV. Περὶ δὲ τοῦ μορίου τοῦ τῆς ψυχῆς ᾧ γινώ-
 σκει τε ἡ ψυχὴ καὶ φρονεῖ, εἴτε χωριστοῦ ὄντος
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following reasons. The sensation of particular things is true, or is only capable of error to the least possible degree. In the second place perception recognizes that these things are accidental, and therefore there is a possibility of error ; for perception does not err in perceiving that this is white, but only as to whether it is this white object or another. Thirdly, sensation is of properties, which are shared and follow the accidental qualities to which the individual things belong ; I mean such things as movement and size, which are accidental properties of sensible objects, concerning which it is emphatically possible to be deceived in sense. But the movement produced by the activity will differ from the sensation which arises from these three senses. The first is true whenever the sensation is present, but the others may be false both when it is present and when it is absent, and especially when the sensible object is at a distance. If, then, the facts stated involve the presence of nothing but imagination, and if this is as we have described, then imagination would be a movement produced by sensation actively operating. But since vision is pre-eminently sensation, the name *φαντασία* (imagination) is derived from *φῶς* (light), because without light it is impossible to see. Again, because imagination resides within us and corresponds with the senses, living creatures frequently act in accordance with them, sometimes because they have no mind, like the wild animals, and sometimes the mind is temporarily clouded over by feeling, or disease, or sleep, as in man. Let this suffice about the nature and cause of imagination.

IV. Concerning that part of the soul with which it knows and thinks, whether it is separable, or not

Feeling and
thinking
are not
analogous.

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εἴτε καὶ μὴ χωριστοῦ κατὰ μέγεθος ἀλλὰ κατὰ λόγον, σκεπτέον τίν' ἔχει διαφοράν, καὶ πῶς ποτὲ γίνεται τὸ νοεῖν. εἰ δὴ ἐστὶ τὸ νοεῖν ὥσπερ τὸ αἰσθάνεσθαι, ἢ πάσχειν τι ἂν εἴη ὑπὸ τοῦ νοητοῦ

15 ἢ τι τοιοῦτον ἕτερον. ἀπαθὲς ἄρα δεῖ εἶναι, δεκτικὸν δὲ τοῦ εἶδους καὶ δυνάμει τοιοῦτον ἀλλὰ μὴ τοῦτο, καὶ ὁμοίως ἔχειν, ὥσπερ τὸ αἰσθητικὸν πρὸς τὰ αἰσθητά, οὕτω τὸν νοῦν πρὸς τὰ νοητά. ἀνάγκη ἄρα, ἐπεὶ πάντα νοεῖ, ἀμυγῇ εἶναι, ὥσπερ φησὶν Ἀναξαγόρας, ἵνα κρατῇ, τοῦτο δ' ἐστὶν ἵνα

20 γνωρίζῃ· παρεμφαινόμενον γὰρ κωλύει τὸ ἀλλότριον καὶ ἀντιφράττει, ὥστε μὴδ' αὐτοῦ εἶναι φύσιν μηδεμίαν ἀλλ' ἢ ταύτην, ὅτι δυνατόν. ὁ ἄρα καλούμενος τῆς ψυχῆς νοῦς (λέγω δὲ νοῦν ᾧ διανοεῖται καὶ ὑπολαμβάνει ἢ ψυχῇ) οὐθέν ἐστιν ἐνεργεία τῶν ὄντων πρὶν νοεῖν. διὸ οὐδὲ μεμῖχθαι

25 εὐλογον αὐτὸν τῷ σώματι· ποιός τις γὰρ ἂν γίγνοιτο, ψυχρὸς ἢ θερμός, ἢ καὶ ὄργανόν τι εἴη, ὥσπερ τῷ αἰσθητικῷ· νῦν δ' οὐθέν ἐστιν. καὶ εὖ δὴ οἱ λέγοντες τὴν ψυχὴν εἶναι τόπον εἰδῶν, πλὴν ὅτι οὔτε ὅλη ἀλλ' ἢ νοητικὴ, οὔτε ἐντελεχεία ἀλλὰ

30 δυνάμει τὰ εἶδη. ὅτι δ' οὐχ ὁμοία ἢ ἀπάθεια τοῦ αἰσθητικοῦ καὶ τοῦ νοητικοῦ, φανερόν ἐπὶ τῶν αἰσθητηρίων καὶ τῆς αἰσθήσεως. ἢ μὲν γὰρ

429 b αἰσθησις οὐ δύναται αἰσθάνεσθαι ἐκ τοῦ σφόδρα αἰσθητοῦ, οἷον ψόφου ἐκ τῶν μεγάλων ψόφων, οὐδ'

ON THE SOUL, III. iv.

separable actually but only in thought, we have to consider what is its distinguishing characteristic, and how the process of thinking arises. If the process of thinking is analogous to feeling, it must be something acted on by the thing thought, or something else of a similar kind. It must (accurately speaking) be not acted upon, but receptive of the form, and potentially of this character though not actually so, and the relation of the thinking capacity to the thing thought must be similar to the relation between the feeling capacity and the thing felt. It is necessary then, seeing that it thinks all thoughts, for it to be unmixed, as Anaxagoras says, in order that it may be in control, that is, that it may know ; for otherwise the foreign body, if it obtruded itself, would hinder and exclude, so that the mind in itself can have no characteristic except its capacity to receive. That part of the soul, then, which we call mind (by mind I mean that part by which the soul thinks and attains belief) has no actual existence until it thinks. So it is unreasonable to suppose that it is mixed with the body ; for in that case it would have a quality of some kind, *e.g.* hot or cold, or would be an organ of some kind, as is the case with what perceives. But, as it is, it has no existence. It has been well said that the soul is the place of forms, except that this does not apply to the soul as a whole, but only in its thinking capacity, and the forms are not actual but only potential. But that the perceptive and thinking faculties are not alike in their incapacity to be acted upon is obvious in the case of the sense organs and sensation. For the sense cannot feel at all under the action of a too violent sensible object ; for instance sounds are not heard when they are loud, and neither

ἐκ τῶν ἰσχυρῶν χρωμάτων καὶ ὁσμῶν οὔτε ὁρᾶν
οὔτε ὁσμᾶσθαι· ἀλλ' ὁ νοῦς ὅταν τι νοήσῃ σφόδρα
νοητόν, οὐχ ἥττον νοεῖ τὰ ὑποδεέστερα, ἀλλὰ καὶ
6 μᾶλλον· τὸ μὲν γὰρ αἰσθητικὸν οὐκ ἄνευ σώματος,
ὁ δὲ χωριστός. ὅταν δ' οὕτως ἕκαστα γένηται
ὡς ἐπιστήμων λέγεται ὁ κατ' ἐνέργειαν (τοῦτο δὲ
συμβαίνει, ὅταν δύνηται ἐνεργεῖν δι' αὐτοῦ), ἔστι
μὲν¹ καὶ τότε δυνάμει πῶς, οὐ μὴν ὁμοίως καὶ
πρὶν μαθεῖν ἢ εὔρεῖν· καὶ αὐτὸς δὲ αὐτὸν τότε
10 δύναιται νοεῖν.

Ἐπεὶ δ' ἄλλο ἐστὶ τὸ μέγεθος καὶ τὸ μεγέθει
εἶναι καὶ ὕδωρ καὶ ὕδατι εἶναι· οὕτω δὲ καὶ ἐφ'
ἐτέρων πολλῶν, ἀλλ' οὐκ ἐπὶ πάντων· ἐπ' ἐνίων
γὰρ ταῦτόν ἐστι τὸ σαρκὶ εἶναι καὶ σάρκα· ἢ ἄλλῃ
ἢ ἄλλως ἔχοντι κρίνει· ἢ γὰρ σὰρξ οὐκ ἄνευ τῆς
ὕλης, ἀλλ' ὥσπερ τὸ σιμὸν τόδε ἐν τῷδε. τῷ
15 μὲν οὖν αἰσθητικῷ τὸ θερμὸν καὶ τὸ ψυχρὸν κρίνει,
καὶ ὦν λόγος τις ἢ σὰρξ· ἄλλῃ δὲ ἦτοι χωριστῷ,
ἢ ὡς ἡ κεκλασμένη ἔχει πρὸς αὐτὴν ὅταν ἐκταθῇ,
τὸ σαρκὶ εἶναι κρίνει. πάλιν δ' ἐπὶ τῶν ἐν ἀφ-
αιρέσει ὄντων τὸ εὐθὺ ὡς τὸ σιμὸν· μετὰ συνεχοῦς
20 γάρ· τὸ δὲ τί ἦν εἶναι, εἰ ἔστιν ἕτερον τὸ εὐθεῖ
εἶναι καὶ τὸ εὐθὺ ἄλλῃ· ἔστω γὰρ δυάς. ἐτέρῳ
ἄρα ἢ ἐτέρως ἔχοντι κρίνει. καὶ ὅλως ἄρα ὡς

¹ ἔστι μὲν ὁμοίως B.

ON THE SOUL, III. iv.

seeing nor smelling is possible when colour and scents are strong; but when the mind thinks an intense thought, it is not less able to think of slighter things, but even more able; for the faculty of sense is not apart from the body, whereas the mind is separable. But when the mind has achieved the power of thinking all thoughts, as the learned man when active is said to have done (and this happens, when he can exercise his functions by himself), even then the mind is in a sense potential, though not quite in the same way as before it learned and discovered; and so, then, the mind is capable of thinking itself.

Now size concrete and size in the abstract are different things, so is water and wateriness; and so also in many other cases but not in all; for instance at times fleshiness and flesh are the same thing; the mind then judges these by a different faculty, or by a faculty in a different condition; for flesh cannot exist without its matter, but just like "snub-nosed" is a definite form in a definite matter. Now it is by the perceptive faculty that sense judges hot and cold, and all the things of which flesh is the explanation; but it is by a different sense, either quite distinct, or related to it in the same way as a bent line to itself when pulled out straight, that we judge what fleshiness is; again, among abstractions straightness is similar to snub-nosed, for it is always combined with extension; but its essential nature, if "straight" and "straightness" are different things, it judges by another sense. We may grant that its definition is the number Two; but in that case it judges by another faculty, or by the same faculty in a different condition. And speaking generally, as objects are

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χωριστὰ τὰ πράγματα τῆς ὕλης, οὕτω καὶ τὰ περὶ τὸν νοῦν.

Ἀπορήσειε δ' ἂν τις, εἰ ὁ νοῦς ἀπλοῦν ἐστὶ καὶ ἀπαθὲς καὶ μηθενὶ μηθέν ἔχει κοινόν, ὥσπερ φησὶν
 25 Ἀναξαγόρας, πῶς νοήσει, εἰ τὸ νοεῖν πάσχειν τί ἐστίν. ἢ γάρ τι κοινόν ἀμφοῖν ὑπάρχει, τὸ μὲν ποιεῖν δοκεῖ τὸ δὲ πάσχειν. ἔτι δ' εἰ νοητὸς καὶ αὐτός. ἢ γὰρ τοῖς ἄλλοις ὁ νοῦς ὑπάρξει (εἰ μὴ κατ' ἄλλο αὐτὸς νοητός, ἐν δέ τι τὸ νοητὸν εἶδει), ἢ μεμιγμένον τι ἔξει, ὃ ποιεῖ νοητὸν αὐτὸν ὥσπερ
 80 τἄλλα. ἢ τὸ μὲν πάσχειν κατὰ κοινόν τι διήρηται πρότερον, ὅτι δυνάμει πῶς ἐστὶ τὰ νοητὰ ὁ νοῦς, ἀλλ' ἐντελεχεία οὐδέν, πρὶν ἂν νοῇ. δεῖ δ' οὕτως
 480 a ὥσπερ ἐν γραμματείῳ ᾧ μηθέν ὑπάρχει ἐντελεχεία γεγραμμένον. ὅπερ συμβαίνει ἐπὶ τοῦ νοῦ. καὶ αὐτὸς δὲ νοητός ἐστίν ὥσπερ τὰ νοητά. ἐπὶ μὲν γὰρ τῶν ἄνευ ὕλης τὸ αὐτό ἐστὶ τὸ νοεῖν καὶ τὸ
 5 νοούμενον· ἢ γὰρ ἐπιστήμη ἢ θεωρητικὴ καὶ τὸ οὕτως ἐπιστητὸν τὸ αὐτό ἐστίν· τοῦ δὲ μὴ ἀεὶ νοεῖν τὸ αἴτιον ἐπισκεπτέον. ἐν δὲ τοῖς ἔχουσιν ὕλην δυνάμει ἕκαστόν ἐστὶ τῶν νοητῶν. ὥστ' ἐκείνοις μὲν οὐχ ὑπάρξει νοῦς (ἄνευ γὰρ ὕλης δύνάμεις ὁ νοῦς τῶν τοιούτων), ἐκείνῳ δὲ τὸ νοητὸν ὑπάρξει.

^a This and the succeeding sentence are not very satisfactory; but A. is apparently arguing that if mind is *sui generis* it cannot be an object of thought, for this would put it in the same class as other objects of thought.

^b Cf. *Met.* xi. 7 and 9.

ON THE SOUL, III. iv.

separable from their matter so also are the functions of the mind.

One might, then, raise the question, if the mind is a simple thing, and not liable to be acted upon, and has nothing in common with anything else, as Anaxagoras says, how will it think, if thinking is a form of being acted upon? For in so far as there is something in it common to both, it seems partly acting and partly being acted upon. And our second problem is whether the mind itself can be an object of thought. Two problems:

(1) How does the mind think?

(2) Is the mind an object of thought?

^a For either the mind will belong to the same category as other objects (if, that is, mind is an object of thought in itself and not in virtue of something else, what is thought being always identical in form), or else it will contain some mixed element, which makes it an object of thought like other things. Or there is the explanation which we have given before of the phrase "being acted upon in virtue of some common element," that the objects of thought and the mind are potentially identical but not actually so, until the mind thinks. This would be in the same sense as when we say that a tablet which is empty is potentially written upon; which actually occurs in the case of the mind. It is, then, itself an object of thought, just like other objects of thought.^b For in the case of things without matter the process of thinking and being thought are the same; just as speculative thinking is the same thing as the object speculatively thought; but we must consider the cause of our not always thinking. But among things having matter potentially, each is an object of thought. So that mind will not belong to the object thought (for mind in such cases is potential and without matter), but the object of thought will belong to the mind.

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10 V. Ἐπεὶ δ' ὥσπερ ἐν ἀπάσῃ τῇ φύσει ἐστὶ τι τὸ μὲν ὕλῃ ἐκάστῳ γένει (τοῦτο δὲ ὁ πάντα δυνάμει ἐκείνα), ἕτερον δὲ τὸ αἷτιον καὶ ποιητικόν, τῷ ποιεῖν πάντα, οἷον ἡ τέχνη πρὸς τὴν ὕλην πέπονθεν, ἀνάγκη καὶ ἐν τῇ ψυχῇ ὑπάρχειν ταύτας τὰς διαφοράς. καὶ ἔστιν ὁ μὲν τοιοῦτος νοῦς τῷ
 15 πάντα γίνεσθαι, ὁ δὲ τῷ πάντα ποιεῖν, ὡς ἕξις τις, οἷον τὸ φῶς· τρόπον γάρ τινα καὶ τὸ φῶς ποιεῖ τὰ δυνάμει ὄντα χρώματα ἐνεργείᾳ χρώματα. καὶ οὗτος ὁ νοῦς χωριστὸς καὶ ἀπαθὴς καὶ ἀμιγῆς τῇ οὐσίᾳ ὧν ἐνεργείᾳ. αἰεὶ γὰρ τιμιώτερον τὸ ποιοῦν τοῦ πάσχοντος καὶ ἡ ἀρχὴ τῆς ὕλης. τὸ
 20 δ' αὐτὸ ἐστὶν ἡ κατ' ἐνέργειαν ἐπιστήμη τῷ πράγματι· ἡ δὲ κατὰ δύνάμιν χρόνῳ προτέρα ἐν τῷ ἐνί, ὅλως δὲ οὐ χρόνῳ· ἀλλ' οὐχ ὅτε μὲν νοεῖ ὅτε δ' οὐ νοεῖ. χωρισθεὶς δ' ἐστὶ μόνον τοῦθ' ὅπερ ἐστὶ, καὶ τοῦτο μόνον ἀθάνατον καὶ αἰδῖον. οὐ μνημονεύομεν δέ, ὅτι τοῦτο μὲν ἀπαθές, ὁ δὲ
 25 παθητικὸς νοῦς φθαρτός, καὶ ἄνευ τούτου οὐθὲν νοεῖ.

VI. Ἡ μὲν οὖν τῶν ἀδιαιρέτων νόησις ἐν τούτοις, περὶ ᾧ οὐκ ἔστι τὸ ψεῦδος· ἐν οἷς δὲ καὶ τὸ ψεῦδος καὶ τὸ ἀληθές, σύνθεσις τις ἤδη νοημάτων ὥσπερ ἐν ὄντων, καθάπερ Ἐμπεδοκλῆς ἔφη “ ἡ πολλῶν
 30 μὲν κόρσαι ἀναύχενες ἐβλάστησαν,” ἔπειτα συντίθεσθαι τῇ φιλίᾳ. οὕτω καὶ ταῦτα κεχωρισμένα συντίθεται, οἷον τὸ ἀσύμμετρον καὶ ἡ διάμετρος,
 430 b ἃν δὲ γινομένων ἢ ἐσομένων, τὸν χρόνον προσ-

ON THE SOUL, III. v.—vi.

V. But since in all nature each class has its matter (this is what they all are potentially), and separate from this is the cause and the agent, in virtue of its making all things, just as art is related to its matter, so similar distinctions must exist in the soul. Mind is then of one kind in virtue of its becoming everything, and of another by making everything, as a state like light; for in a sense light makes what are potentially colours into actual colours. And this mind when acting is separable, not acted upon and unmixed in its essence. For acting upon is always superior to being acted upon, and the final cause superior to the matter. But knowledge, when acting, is identical with its object. The potential is prior in time to the actual in a single individual, but speaking generally it is not prior in time; the mind does not think at times, and at other times not think. But it only realizes its true nature when it is separated, and this is the only time when it is immortal and everlasting. We do not remember because the mind in this sense cannot be acted upon, but the mind which is acted upon is perishable and without this does not think.

VI. Thinking of indivisible units occurs among things concerning which there is no possibility of falsehood; in cases where truth and falsehood are possible, there is a compounding of thoughts made into a fresh unity, as Empedocles said, "whereby the heads of many beings grew without necks," and then were joined together by Love. So also these separate entities are combined, as for instance the incommensurable and the diagonal. But if the thinking is concerned with things becoming or about to exist, then in its thought it adds and combines

Mind active
and passive.

Individual
and
combined
concepts.

εννοῶν καὶ συντιθείς. τὸ γὰρ ψεῦδος ἐν συν-
 θέσει αἰεί· καὶ γὰρ ἂν τὸ λευκὸν μὴ λευκόν, τὸ
 μὴ λευκὸν συνέθηκεν. ἐνδέχεται δὲ καὶ διαίρεσιν
 φάναι πάντα. ἀλλ' οὖν ἔστι γε οὐ μόνον τὸ ψεῦδος
 5 ἢ ἀληθές, ὅτι λευκὸς Κλέων ἐστίν, ἀλλὰ καὶ ὅτι
 ἦν ἢ ἔσται. τὸ δὲ ἐν ποιοῦν, τοῦτο ὁ νοῦς ἕκαστον.

Τὸ δ' ἀδιαίρετον ἐπεὶ διχῶς, ἢ δυνάμει ἢ
 ἐνεργείᾳ, οὐθὲν κωλύει νοεῖν τὸ ἀδιαίρετον, ὅταν
 νοῇ τὸ μῆκος· ἀδιαίρετον γὰρ ἐνεργείᾳ καὶ ἐν
 χρόνῳ ἀδιαιρέτῳ· ὁμοίως γὰρ ὁ χρόνος διαιρετός
 10 καὶ ἀδιαιρέτος τῷ μήκει. οὐκ οὖν ἔστιν εἰπεῖν ἐν
 τῷ ἡμίσει τί ἐννοεῖ ἑκατέρῳ· οὐ γὰρ ἔστιν, ἂν
 μὴ διαιρεθῇ, ἀλλ' ἢ δυνάμει. χωρὶς δ' ἑκάτερον
 νοῶν τῶν ἡμίσεων διαιρεῖ καὶ τὸν χρόνον ἅμα·
 τότε δ' οἶονεῖ μήκη. εἰ δ' ὡς ἐξ ἀμφοῖν, καὶ ἐν
 τῷ χρόνῳ τῷ ἐπ' ἀμφοῖν.

15 Τὸ δὲ μὴ κατὰ ποσὸν ἀδιαίρετον ἀλλὰ τῷ εἶδει
 νοεῖ ἐν ἀδιαιρέτῳ χρόνῳ καὶ ἀδιαιρέτῳ τῆς ψυχῆς·
 κατὰ συμβεβηκὸς δέ, καὶ οὐχ ἥ ἐκεῖνα διαιρετά,
 ᾧ νοεῖ καὶ ἐν ᾧ χρόνῳ, ἀλλ' ἥ ἀδιαίρετα· ἐνεστι
 γὰρ καὶ τούτοις τι ἀδιαίρετον, ἀλλ' ἴσως οὐ
 χωριστόν, ὃ ποιεῖ ἓνα τὸν χρόνον καὶ τὸ μῆκος.
 20 καὶ τοῦθ' ὁμοίως ἐν ᾧ παντί ἐστι τῷ συνεχεῖ καὶ
 χρόνῳ καὶ μήκει. ἡ δὲ στιγμή καὶ πᾶσα διαίρεσις,
 καὶ τὸ οὕτως ἀδιαίρετον, δηλοῦται ὥσπερ ἡ

ON THE SOUL, III. vi.

the notion of time. For falsehood always lies in the process of combination, for if a man calls white not-white, he has combined the notion not-white. It is equally possible to say that everything involves division. But it is not merely true or false to say that Cleon is white, but we must add that he was or will be. But the principle which unifies is in every case the mind.

But because the indivisible has two senses—Indivisible has two meanings. potential or actual—there is nothing to prevent the mind from thinking of the indivisible when it thinks of length; for it is in actuality indivisible, and is in indivisible time. Time is also both divisible and indivisible in the same sense as length. So it is impossible to say what the mind thinks in each half of the time; for it has no existence, unless it is divided, except potentially. But by thinking of each of the halves separately, it divides the time and the line as well, and then thinks of the line as two lengths. But if the mind is thinking of the line as composed of two halves, so also it is considering the time as composed of two halves.

But when the object of thought is not quantitatively indivisible, but only in form, the mind thinks of it in indivisible time, and with the indivisible faculty of the soul; but incidentally this whole is divisible, not in the sense in which the faculty used and the time are divisible, but in the sense in which they are indivisible; for there is an indivisible element even in these, though perhaps incapable of separate existence, which makes the line and the length one. And this is equally true of every continuous thing whether time or length. A point and every sort of division and everything undivided in this

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στέρησις. καὶ ὁμοιος ὁ λόγος ἐπὶ τῶν ἄλλων, οἷον πῶς τὸ κακὸν γνωρίζει ἢ τὸ μέλαν· τῷ ἐναντίῳ γάρ πως γνωρίζει. δεῖ δὲ δυνάμει εἶναι τὸ γνωρίζον καὶ ἐνεῖναι ἐν αὐτῷ. εἰ δέ τιμι μή
 25 ἐστὶν ἐναντίον,¹ αὐτὸ ἑαυτὸ γινώσκει καὶ ἐνεργεῖα ἐστὶ καὶ χωριστόν. ἔστι δ' ἡ μὲν φάσις τι κατὰ τινος, ὥσπερ ἡ κατάφασις, καὶ ἀληθῆς ἢ ψευδῆς πᾶσα· ὁ δὲ νοῦς οὐ πᾶς, ἀλλ' ὁ τοῦ τί ἐστὶ κατὰ τὸ τί ἦν εἶναι ἀληθῆς, καὶ οὐ τί κατὰ τινος· ἀλλ'
 30 ὥσπερ τὸ ὁρᾶν τοῦ ἰδίου ἀληθές, εἰ δ' ἄνθρωπος τὸ λευκὸν ἢ μὴ, οὐκ ἀληθές ἀεί, οὕτως ἔχει ὅσα ἄνευ ὕλης.

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VII. Τὸ δ' αὐτὸ ἐστὶν ἡ κατ' ἐνέργειαν ἐπιστήμη τῷ πράγματι. ἡ δὲ κατὰ δύνάμιν χρόνῳ προτέρα ἐν τῷ ἐνί, ὅλως δὲ οὐδὲ χρόνῳ· ἐστὶ γὰρ ἐξ ἐν-τελεχείᾳ ὄντος πάντα τὰ γιγνόμενα. φαίνεται δὲ
 5 τὸ μὲν αἰσθητὸν ἐκ δυνάμει ὄντος τοῦ αἰσθητικοῦ ἐνεργεῖα ποιοῦν· οὐ γὰρ πάσχει οὐδ' ἀλλοιοῦται. διὸ ἄλλο εἶδος τοῦτο κινήσεως· ἡ γὰρ κίνησις τοῦ ἀτελοῦς ἐνέργεια ἦν, ἡ δ' ἀπλῶς ἐνέργεια ἑτέρα ἢ τοῦ τετελεσμένου. τὸ μὲν οὖν αἰσθάνεσθαι ὁμοιον τῷ φάναι μόνον καὶ νοεῖν· ὅταν δὲ ἡδὺ
 10 ἢ λυπηρόν, οἷον καταφᾶσα ἢ ἀποφᾶσα, διώκει ἢ φεύγει· καὶ ἔστι τὸ ἡδεσθαι καὶ λυπεῖσθαι τὸ ἐν-εργεῖν τῇ αἰσθητικῇ μεσότητι πρὸς τὸ ἀγαθὸν ἢ κακόν, ἢ τοιαῦτα. καὶ ἡ φυγὴ δὲ καὶ ἡ ὀρεξις τοῦτο ἡ κατ' ἐνέργειαν, καὶ οὐχ ἕτερον τὸ

¹ ἐναντίον τῶν αἰτίων B.

ON THE SOUL, III. VI.—VII.

sense is made clear to us in the case of negation. And the same reasoning applies in other cases ; for instance how the mind knows evil or black ; for it recognizes each in some sense by its opposite. But the recognizing faculty must reside potentially in the mind. But if there is anything which has no opposite then it recognizes itself, and is also in actuality separate. But a statement asserts something of something like any affirmation, and every one is either true or false ; but this is not always so with the mind : when it is dealing with the nature of a thing in the abstract sense, and not with any particular example of it, it is always true ; just as vision of a particular thing is always true, but when seeing whether the white object is a man or not, it is not always true, so it is with every quality apart from its matter.

VII. Knowledge when actively operative is identical with its object. In the individual potential knowledge has priority in time, but speaking absolutely it has no such priority ; for that which becomes grows out of that which actually is. And clearly the sensible object makes the sense capacity actually operative from being only potential ; it is not acted upon, nor does it undergo change of state ; and so, if it is motion, it is motion of a distinct kind ; for movement is the activity of the imperfect, but movement in the simplest sense, that is movement of the perfect, is different. Sensation, then, is like mere assertion and mere thinking ; when sensation asserts or denies that something is pleasant or unpleasant, it pursues or avoids it. In fact to feel pleasure or pain is to adopt an attitude with the sensitive mean towards good and evil as such. This is what avoidance or pursuit, when active, really means, and the

The practical intellect in operation.

ARISTOTLE

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ὀρεκτικὸν καὶ φευκτικόν, οὐτ' ἀλλήλων οὔτε τοῦ αἰσθητικοῦ· ἀλλὰ τὸ εἶναι ἄλλο. τῇ δὲ διανοητικῇ
 15 ψυχῇ τὰ φαντάσματα οἷον αἰσθήματα ὑπάρχει.
 ὅταν δὲ ἀγαθὸν ἢ κακὸν φήσῃ ἢ ἀποφήσῃ, φεύγει
 ἢ διώκει. διὸ οὐδέποτε νοεῖ ἄνευ φαντάσματος ἢ
 ψυχῇ, ὥσπερ δὲ ὁ ἀῆρ τὴν κόρην τοιανδὶ ἐποίησεν,
 αὐτὴ δ' ἕτερον, καὶ ἡ ἀκοή ὡσαύτως· τὸ δὲ
 ἔσχατον ἔν, καὶ μία μεσότης· τὸ δ' εἶναι αὐτῇ
 20 πλείω.

Τίνι δ' ἐπικρίνει τί διαφέρει γλυκὺ καὶ θερμόν,
 εἴρηται μὲν καὶ πρότερον, λεκτέον δὲ καὶ ὧδε.
 ἔστι γὰρ ἔν τι, οὕτω δὲ καὶ ὡς ὄρος. καὶ ταῦτα
 ἔν τῷ ἀνάλογον καὶ τῷ ἀριθμῷ ὃν ἔχει πρὸς
 ἐκάτερον, ὡς ἐκεῖνα πρὸς ἄλληλα· τί γὰρ διαφέρει
 25 τὸ ἀπορεῖν πῶς τὰ ὁμογενῇ κρίνει ἢ τὰναντία,
 οἷον λευκὸν καὶ μέλαν; ἔστω δὴ ὡς τὸ Α τὸ
 λευκὸν πρὸς τὸ Β τὸ μέλαν, τὸ Γ πρὸς τὸ Δ ὡς
 ἐκεῖνα πρὸς ἄλληλα· ὥστε καὶ ἐναλλάξ. εἰ δὴ
 τὰ ΓΔ ἐνὶ εἴῃ ὑπάρχοντα, οὕτως ἔξει ὥσπερ καὶ
 τὰ ΑΒ, τὸ αὐτὸ μὲν καὶ ἔν, τὸ δ' εἶναι οὐ τὸ
 431 b αὐτό, καὶ ἐκείνο ὁμοίως. ὁ δ' αὐτὸς λόγος καὶ εἰ
 τὸ μὲν Α τὸ γλυκὺ εἴῃ, τὸ δὲ Β τὸ λευκόν.

Τὰ μὲν οὖν εἶδη τὸ νοητικὸν ἐν τοῖς φαντάσμασι
 νοεῖ, καὶ ὡς ἐν ἐκείνοις ὥριστα αὐτῷ τὸ διωκτὸν
 καὶ φευκτόν, καὶ ἐκτὸς τῆς αἰσθήσεως, ὅταν ἐπὶ
 5 τῶν φαντασμάτων ᾗ, κινεῖται, οἷον αἰσθανόμενος

^a Aristotle is referring to a mathematical theorem. If $A:B::C:D$ then $A:C::B:D$.

ON THE SOUL, III. VII.

instincts to pursue or avoid are not really different from each other, or from the sensitive faculty, though their actual essence is different. Now images occur in the soul in its thinking capacity, just like feelings. But when the soul asserts or denies that something is good or evil, it avoids or pursues. Hence the soul never thinks without a mental picture ; and just as the air is the medium which makes the eye in such a state, and the eye again affects something else, so also does the hearing ; but the last thing to be affected is a single unit, and a single mean. But its essence is really plural.

We have explained before by what means the soul distinguishes between sweet and hot, but some further considerations must be added. For it is a unit, and in this sense some sort of limit. But this is a unit which, by analogy or by number, bears the same relation to each of the two, as they do to each other. For what does it matter whether we ask how the soul distinguishes things which are not of the same class, or homogeneous opposites, like white and black ? Suppose the relation of A (white) to B (black) to be the same as the relation of C to D. Then the proposition *alternando* will be true.^a If again C and D belong to one subject, their ratio will be the same as A to B, the same and a unity, but their real essence will not be the same, and similarly with the other term. The same ratio would be established if A were sweet and B white.

So the thinking faculty thinks of its forms in mental pictures, and, just as what is pursued and avoided is defined in them, so also it is outside sensation ; whenever it is a case of mental pictures, there is movement. For instance in perceiving a beacon a man

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- τὸν φρυκτὸν ὅτι πῦρ,¹ γνωρίζει, ὁρῶν κινούμενον, ὅτι πολέμιος. ὅτε δὲ τοῖς ἐν τῇ ψυχῇ φαντάσμασιν ἢ νοήμασιν ὥσπερ ὁρῶν λογίζεται καὶ βουλεύεται τὰ μέλλοντα πρὸς τὰ παρόντα· καὶ ὅταν εἴπῃ ὡς ἐκεῖ τὸ ἡδὺ ἢ λυπηρόν, ἐνταῦθα φεύγει ἢ διώκει,
- 10 καὶ ὅλως ἐν πράξει. καὶ τὸ ἄνευ δὲ πράξεως, τὸ ἀληθές καὶ τὸ ψεῦδος ἐν τῷ αὐτῷ γένει ἐστὶ τῷ ἀγαθῷ καὶ κακῷ· ἀλλὰ τῷ γε ἀπλῶς διαφέρει καὶ τινί. τὰ δὲ ἐν ἀφαιρέσει λεγόμενα νοεῖ ὥσπερ ἂν εἰ τὸ σιμόν, ἢ μὲν σιμόν, οὐ κεχωρισμένως, ἢ
- 15 δὲ κοῖλον, εἴ τις ἐνόει ἐνεργεῖα, ἄνευ τῆς σαρκὸς ἂν ἐνόει ἐν ἢ τὸ κοῖλον. οὕτω τὰ μαθηματικὰ οὐ κεχωρισμένα ὡς κεχωρισμένα νοεῖ, ὅταν νοῇ ἐκεῖνα. ὅλως δὲ ὁ νοῦς ἐστὶν ὁ κατ' ἐνεργεῖαν τὰ πράγματα νοῶν. ἄρα δ' ἐνδέχεται τῶν κεχωρισμένων τι νοεῖν ὄντα αὐτὸν μὴ κεχωρισμένον μεγέθους, ἢ οὐ, σκεπτέον ὕστερον.
- 20 VIII. Νῦν δὲ περὶ ψυχῆς τὰ λεχθέντα συγκεφαλαιώσαντες, εἵπωμεν πάλιν ὅτι ἡ ψυχὴ τὰ ὄντα πῶς ἐστὶ πάντα. ἢ γὰρ αἰσθητὰ τὰ ὄντα ἢ νοητά, ἐστὶ δ' ἢ ἐπιστήμη μὲν τὰ ἐπιστητά πως, ἢ δ' αἰσθησις τὰ αἰσθητά· πῶς δὲ τοῦτο, δεῖ ζητεῖν. τέμνεται
- 25 οὖν ἢ ἐπιστήμη καὶ ἢ αἰσθησις εἰς τὰ πράγματα, ἢ μὲν δυνάμει εἰς τὰ δυνάμει, ἢ δ' ἐντελεχείᾳ εἰς τὰ ἐντελεχεῖα. τῆς δὲ ψυχῆς τὸ αἰσθητικὸν καὶ τὸ ἐπιστημονικὸν δυνάμει ταυτόν ἐστι, τὸ μὲν ἐπιστητὸν τὸ δὲ αἰσθητόν. ἀνάγκη δ' ἢ αὐτὰ ἢ

¹ πῦρ, τῇ κοινῇ Β.

ON THE SOUL, III. VII.—VIII.

recognizes that it is fire ; then seeing it moving he knows that it signifies an enemy. But at other times one calculates by images or thoughts residing in the soul, as if one saw them, and plans for the future in view of the present ; and when one says in the case of sensation that it is pleasant or unpleasant, in the realm of thought one avoids or pursues, and so generally in action. Setting aside the question of action, what is true or false belongs to the same category as what is good or evil ; but they differ by being universal, or referring to some particular. In mathematical abstraction, as it is called, the mind thinks as if it were considering snub-nosed *qua* snub-nosed, not as a quality detached from flesh, but as hollow ; if the mind were actively thinking it could conceive snub-nosed apart from the flesh in which the hollow resides. So when the mind thinks of mathematics, it thinks of them as separable though actually they are not. But speaking generally the mind means the mind actually thinking on its objects. Whether it is possible for the mind to think of qualities separated from their objects without being itself separated from dimension or not, must be considered later.

VIII. Now summing up what we have said about Summary. the soul, let us assert once more that in a sense the soul is all the existing universe. For the universe consists of objects felt, and objects thought of, and knowledge relates to the latter and sensation to the former ; but we must consider how this comes about. Both knowledge and sensation are divided into two in relation to their objects, the potential to the potential, and the actual to the actual. The potential faculty of the soul both sensitive and intellectual is the same, partly intellectual and partly sensitive. These

- 481 b τὰ εἶδη εἶναι. αὐτὰ μὲν γὰρ δὴ οὐ· οὐ γὰρ ὁ
 482 a λίθος ἐν τῇ ψυχῇ, ἀλλὰ τὸ εἶδος· ὥστε ἡ ψυχὴ
 ὥσπερ ἡ χεὶρ ἐστίν· καὶ γὰρ ἡ χεὶρ ὄργανόν ἐστιν
 ὀργάνων, καὶ ὁ νοῦς εἶδος εἰδῶν καὶ ἡ αἴσθησις
 εἶδος αἰσθητῶν. ἐπεὶ δὲ οὐδὲ πρᾶγμα οὐθέν ἐστι
 παρὰ τὰ μεγέθη, ὥς δοκεῖ, τὰ αἰσθητὰ κεχωρισ-
 5 μένον, ἐν τοῖς εἶδεσι τοῖς αἰσθητοῖς τὰ νοητά ἐστι,
 τά τε ἐν ἀφαιρέσει λεγόμενα, καὶ ὅσα τῶν αἰσθητῶν
 ἕξεις καὶ πάθη. καὶ διὰ τοῦτο οὔτε μὴ αἰσθανό-
 μενος μὴθὲν οὐθέν ἂν μάθοι οὐδὲ ξυνείη· ὅταν τε
 θεωρῇ, ἀνάγκη ἅμα φάντασμά τι θεωρεῖν· τὰ γὰρ
 10 φαντάσματα ὥσπερ αἰσθημάτων ἐστι, πλὴν ἄνευ
 ὕλης. ἐστὶ δ' ἡ φαντασία ἕτερον φάσεως καὶ
 ἀποφάσεως· συμπλοκὴ γὰρ νοημάτων ἐστὶ τὸ
 ἀληθὲς ἢ ψεῦδος. τὰ δὲ πρῶτα νοήματα τίνι
 διοίσει τοῦ μὴ φαντάσματα εἶναι; ἢ οὐδὲ τᾶλλα
 φαντάσματα, ἀλλ' οὐκ ἄνευ φαντασμάτων.
- 15 IX. Ἐπεὶ δὲ ἡ ψυχὴ κατὰ δύο ὥρισταὶ δυνάμεις
 ἡ τῶν ζώων, τῷ τε κριτικῷ, ὃ διανοίας ἔργον ἐστὶ
 καὶ αἰσθήσεως, καὶ ἔτι τῷ κινεῖν τὴν κατὰ τόπον
 κίνησιν, περὶ μὲν αἰσθήσεως καὶ νοῦ διωρίσθω
 τοσαῦτα, περὶ δὲ τοῦ κινουίντος, τί ποτέ ἐστι τῆς
 20 ψυχῆς, σκεπτέον, πότερον ἔν τι μόριον αὐτῆς
 χωριστὸν ὃν ἢ μεγέθει ἢ λόγῳ, ἢ πᾶσα ἡ ψυχὴ,

ON THE SOUL, III. VIII.—IX.

faculties, then, are identical either with the objects themselves or with their forms. Now they are not identical with the object themselves ; for the stone does not exist in the soul, but only the form of the stone. The soul, then, acts like a hand ; for the hand is an instrument which employs instruments, and in the same way the mind is a form which employs forms, and sensation is a form which employs the forms of sensible objects. But since apparently nothing has a separate existence, except apprehended magnitudes, things thought appear in the forms of sensible objects ; so do the so-called mathematical abstractions, and all those things which are the conditions or affections of sensible objects. And for this reason no one could ever learn or understand anything, if he had not the faculty of perception ; even when he thinks speculatively, he must have some mental picture of which to think ; for mental images are similar to objects perceived except that they are without matter. But imagination is not the same thing as assertion and denial ; for truth and falsehood is a combination of things thought. How then will the simplest thoughts differ from mental pictures ? Surely neither these simple thoughts nor others are mental pictures, but cannot occur without such mental pictures.

Thought and feeling are not identical but interdependent.

IX. But since the soul in living creatures is defined by two functions, the judging capacity which is a function of the intellect and of sensation combined, and secondly by the capacity for movement in space, we have completed our account of sensation and mind and must now consider what part of the soul the capacity for movement is ; whether it is a part separable from the soul itself, either in actual magnitude

The relation of the soul to movement.

432 a

καὶν εἰ μόριόν τι, πότερον ἴδιόν τι παρὰ τὰ εἰωθότα
λέγεσθαι καὶ τὰ εἰρημένα, ἢ τούτων ἓν τι. ἔχει
δὲ ἀπορίαν εὐθύς πῶς τε δεῖ μόρια λέγειν τῆς
ψυχῆς καὶ πόσα. τρόπον γάρ τινα ἄπειρα φαίνεται,

25 καὶ οὐ μόνον ἃ τινες λέγουσι διορίζοντες, λογι-
στικὸν καὶ θυμικὸν καὶ ἐπιθυμητικόν, οἳ δὲ τὸ
λόγον ἔχον καὶ τὸ ἄλογον· κατὰ γὰρ τὰς διαφορὰς
δι' ἃς ταῦτα χωρίζουσι, καὶ ἄλλα φανέεται μόρια
μείζω διάστασιν ἔχοντα τούτων, περὶ ὧν καὶ νῦν
εἴρηται, τό τε θρεπτικόν, ὃ καὶ τοῖς φυτοῖς

30 ὑπάρχει καὶ πᾶσι τοῖς ζώοις, καὶ τὸ αἰσθητικόν,
ὃ οὔτε ὡς ἄλογον οὔτε ὡς λόγον ἔχον θείη ἂν τις

432 b ῥαδίως. ἔτι δὲ τὸ φανταστικόν, ὃ τῷ μὲν εἶναι
πάντων ἕτερον, τινὲ δὲ τούτων ταῦτόν ἢ ἕτερον,
ἔχει πολλὴν ἀπορίαν, εἴ τις θήσῃ κεχωρισμένα
μόρια τῆς ψυχῆς. πρὸς δὲ τούτοις τὸ ὀρεκτικόν,
ὃ καὶ λόγῳ καὶ δυνάμει ἕτερον ἂν δόξειεν εἶναι
5 πάντων. καὶ ἄτοπον δὴ τοῦτο διασπᾶν· ἓν τε τῷ
λογιστικῷ γὰρ ἢ βούλησις γίνεται, καὶ ἐν τῷ
ἀλόγῳ ἢ ἐπιθυμία καὶ ὁ θυμός· εἰ δὲ τρία ἢ
ψυχὴ, ἐν ἐκάστῳ ἔσται ὀρεξεις.

Καὶ δὴ καὶ περὶ οὗ νῦν ὁ λόγος ἐνέστηκε, τί
τὸ κινεῖν κατὰ τόπον τὸ ζῶόν ἐστιν; τὴν μὲν
γὰρ κατ' αὔξησιν καὶ φθίσιν κίνησιν, ἅπασιν ὑπ-
10 ἄρχουσιν, τὸ πᾶσιν ὑπάρχον δόξειεν ἂν κινεῖν τὸ
182

ON THE SOUL, III. IX.

or only in thought, or whether it is the whole soul ; and if it is a part, whether it is a special part beyond those usually described, and of which we have given an account, or whether it is one of them. The first difficulty that arises is this : in what sense can we speak of parts of the soul, and how many are there ? For in one sense they seem to be infinite, and not confined to those which men refer to, when they attempt definition ; men call the parts rational, passionate, and appetitive, or, as others have it, rational and irrational. Now when we consider the differences according to which they classify, we shall find other parts exhibiting greater differences than those of which we have already spoken ; for instance the nutritive part, which belongs to plants and to all living creatures, and the sensitive part which one could not easily assign either to the rational or irrational part, and also the imaginative part, which appears to be different in essence from them all, but which is extremely difficult to identify with, or to distinguish from any one of them. All this creates serious problems, if one supposes separate parts of the soul. Beyond these again is the appetitive part, which both logically and potentially appears to be different from them all. And it is unreasonable to divorce this from the rest ; for there is purpose in the reasoning faculty, and desire and anger in the irrational part ; but if the soul is divided into three, appetite will be found in each.

Parts of
the soul.

Moreover in the subject with which our present argument is concerned, which is the part which makes the living creature move in space ? The generative and nutritive faculties, which all share, would seem responsible for movement in the sense of growth and

Movement
cannot be
associated
with any
one part of
the soul.

432 b

γεννητικὸν καὶ θρεπτικόν· περὶ δὲ ἀναπνοῆς καὶ
 ἐκπνοῆς καὶ ὕπνου καὶ ἐγρηγόρσεως ὕστερον ἐπι-
 σκεπτέον· ἔχει γὰρ καὶ ταῦτα πολλήν ἀπορίαν.
 ἀλλὰ περὶ τῆς κατὰ τόπον κινήσεως, τί τὸ κινοῦν
 τὸ ζῶον τὴν πορευτικὴν κίνησιν, σκεπτέον. ὅτι
 15 μὲν οὖν οὐχ ἡ θρεπτικὴ δύναμις, δῆλον· αἰεὶ τε
 γὰρ ἕνεκά του ἡ κίνησις αὕτη, καὶ ἡ μετὰ φαν-
 τασίας ἡ ὁρέξεώς ἐστιν· οὐθέν γὰρ μὴ ὀρεγόμενον
 ἢ φεύγον κινεῖται ἀλλ' ἡ βία. ἔτι καὶ τὰ φυτὰ
 κινητικὰ ἦν, καὶ εἶχέ τι μόριον ὀργανικὸν πρὸς
 τὴν κίνησιν ταύτην. ὁμοίως δὲ οὐδὲ τὸ αἰσθη-
 20 τικόν· πολλὰ γάρ ἐστι τῶν ζώων ἃ αἰσθησιν μὲν
 ἔχει, μόνιμα δ' ἐστὶ καὶ ἀκίνητα διὰ τέλους. εἰ
 οὖν ἡ φύσις μήτε ποιεῖ μάτην μηθὲν μήτε ἀπο-
 λείπει τι τῶν ἀναγκαίων, πλὴν ἐν τοῖς πηρώμασι
 καὶ ἐν τοῖς ἀτελέσιν· (τὰ δὲ τοιαῦτα τῶν ζώων
 τέλεια καὶ οὐ πηρώματά ἐστιν· σημεῖον δ' ὅτι
 25 ἔστι γεννητικὰ καὶ ἀκμὴν ἔχει καὶ φθίσιν·) ὥστ'
 εἶχεν ἂν καὶ τὰ ὀργανικὰ μέρη τῆς πορείας. ἀλλὰ
 μὴν οὐδὲ τὸ λογιστικὸν καὶ ὁ καλούμενος νοῦς
 ἐστὶν ὁ κινῶν· ὁ μὲν γὰρ θεωρητικὸς οὐθέν νοεῖ
 πρακτόν, οὐδὲ λέγει περὶ φευκτοῦ καὶ διωκτοῦ
 οὐθέν, ἡ δὲ κίνησις ἢ φεύγοντός τι ἢ διώκοντός
 30 τί ἐστιν. ἀλλ' οὐδ' ὅταν θεωρῇ τι τοιοῦτον, ἥδη
 κελεύει φεύγειν ἢ διώκειν, οἷον πολλάκις διανοεῖται
 φοβερόν τι ἢ ἡδύ, οὐ κελεύει δὲ φοβεῖσθαι, ἡ δὲ
 438 α καρδιά κινεῖται, ἂν δ' ἡδύ, ἕτερόν τι μόριον. ἔτι

^a i.e. if movement in space were due to the sensitive faculty.

ON THE SOUL, III. ix.

decay, as this movement belongs to them all ; later on we shall have to consider inspiration and expiration, and sleep and wakefulness : for these also present considerable difficulty. But dealing with movement in space, we must consider what it is that causes the living animal to exhibit a travelling movement. It is obvious that it is not the nutritive capacity ; for this movement always has an object in view, and is combined with imagination or appetency ; for nothing moves except under compulsion, unless it is seeking or avoiding something. But then plants should show capacity for movement, and should be seen to have some part instrumental towards this movement. Nor is it the sensitive faculty ; for there are many living creatures which have feeling, but are stationary, and do not move throughout their existence. Then seeing that nature does nothing in vain, nor omits anything essential, except in maimed or imperfect animals (and the sort of animal under consideration is perfect and not maimed ; this is proved by the fact that they propagate their species and have a zenith and decline), they would have parts instrumental to that end.^a Nor is the reasoning faculty, which is called mind, the motive principle, for the speculative mind thinks of nothing practical, and does not comment on what is to be avoided or pursued ; but movement is characteristic of one who is either avoiding or pursuing something. Even when the mind speculates on anything of the kind, it does not issue orders to avoid or pursue ; for instance it often reflects that something is fearful or sweet, but gives no orders to fear. It is the heart which produces this movement, and if it is sweet some other part. But when the mind gives any

433 a

καὶ ἐπιτάττοντος τοῦ νοῦ καὶ λεγούσης τῆς διανοίας
 φεύγειν τι ἢ διώκειν οὐ κινεῖται, ἀλλὰ κατὰ τὴν
 ἐπιθυμίαν πράττει, οἷον ὁ ἀκρατής. καὶ ὅλως δὲ
 ὁρῶμεν ὅτι ὁ ἔχων τὴν ἰατρικὴν οὐκ ἰᾶται, ὥς
 5 ἐτέρου τινὸς κυρίου ὄντος τοῦ ποιεῖν κατὰ τὴν
 ἐπιστήμην, ἀλλ' οὐ τῆς ἐπιστήμης. ἀλλὰ μὴν
 οὐδ' ἡ ὄρεξις ταύτης κυρία τῆς κινήσεως· οἱ γὰρ
 ἐγκρατεῖς ὁρεγόμενοι καὶ ἐπιθυμοῦντες οὐ πράτ-
 τουσιν ὧν ἔχουσι τὴν ὄρεξιν, ἀλλ' ἀκολουθοῦσι
 τῷ νῷ.

- 10 X. Φαίνεται δέ γε δύο ταῦτα κινούμενα, ἡ ὄρεξις
 ἡ νοῦς, εἴ τις τὴν φαντασίαν τιθείη ὥς νόησιν τινα·
 πολλὰ γὰρ παρὰ τὴν ἐπιστήμην ἀκολουθοῦσι ταῖς
 φαντασίαις, καὶ ἐν τοῖς ἄλλοις ζώοις οὐ νόησις
 οὐδὲ λογισμός ἐστιν, ἀλλὰ φαντασία. ἄμφω ἄρα
 ταῦτα κινητικὰ κατὰ τόπον, νοῦς καὶ ὄρεξις.
 νοῦς δὲ ὁ ἕνεκά του λογιζόμενος καὶ ὁ πρακτικός·
 15 διαφέρει δὲ τοῦ θεωρητικοῦ τῷ τέλει. καὶ ἡ
 ὄρεξις ἕνεκά του πᾶσα· οὐ γὰρ ἡ ὄρεξις, αὕτη
 ἀρχὴ τοῦ πρακτικοῦ νοῦ· τὸ δ' ἔσχατον ἀρχὴ τῆς
 πράξεως. ὥστε εὐλόγως ταῦτα δύο φαίνεται τὰ
 κινούμενα, ὄρεξις καὶ διάνοια πρακτική· τὸ ὁρεκτὸν
 γὰρ κινεῖ, καὶ διὰ τοῦτο ἡ διάνοια κινεῖ, ὅτι ἀρχὴ
 20 αὐτῆς ἐστὶ τὸ ὁρεκτὸν. καὶ ἡ φαντασία δὲ ὅταν
 κινῇ, οὐ κινεῖ ἄνευ ὁρέξεως. ἐν δὴ τι τὸ κινεῖν
 τὸ ὁρεκτόν. εἰ γὰρ δύο, νοῦς καὶ ὄρεξις, ἐκίνουν,

ON THE SOUL, III. ix.—x.

orders, and reflection suggests avoidance or pursuit, the man does not move, but his action is prompted by desire, as we see in the incontinent man. Speaking generally, we see that the man possessing knowledge of the healing art is not always healing, so that there is some other factor which causes action in accordance with knowledge, and not knowledge itself. Finally, it is not appetency which is responsible for movement ; for the self-controlled, though they may crave and desire, do not do these things for which they have an appetite, but follow their reason.

X. There are clearly, then, two agents which produce movement, appetite and mind, if, that is, one regards imagination as some sort of thinking process ; for men often follow their imaginations contrary to knowledge, and in living creatures other than man there is neither thinking nor calculation, but only imagination. These together, then, mind and appetite, are responsible for movement in space. But the mind in question is that which makes its calculations with an end in view, that is the practical mind : it differs from the speculative mind in that it has an end in view. And every appetite is directed towards an end ; for the thing at which appetite aims is the starting-point of the practical mind ; the last step of the practical mind is the beginning of the action. So that these two, appetite and practical mind, seem reasonably considered as the producers of movement ; for that which is craved for produces movement, and the mind produces movement for this reason, that the thing craved for is its beginning. Whenever imagination produces movement, it does not do so without appetite. And so the main single moving cause seems to be what is desired. If there were

Causes of
movement.

483 a

κατὰ κοινὸν ἂν τι ἐκίνουν εἶδος. νῦν δὲ ὁ μὲν
 νοῦς οὐ φαίνεται κινῶν ἄνευ ὀρέξεως· ἡ γὰρ
 βούλησις ὀρεξίς· ὅταν δὲ κατὰ τὸν λογισμὸν
 25 κινῆται, καὶ κατὰ βούλησιν κινεῖται. ἡ δ' ὀρεξίς
 κινεῖ παρὰ τὸν λογισμὸν· ἡ γὰρ ἐπιθυμία ὀρεξίς
 τις ἐστίν. νοῦς μὲν οὖν πᾶς ὀρθός· ὀρεξίς δὲ καὶ
 φαντασία καὶ ὀρθή καὶ οὐκ ὀρθή. διὸ ἀεὶ κινεῖ
 μὲν τὸ ὀρεκτόν, ἀλλὰ τοῦτ' ἐστὶν ἢ τὸ ἀγαθὸν ἢ
 τὸ φαινόμενον ἀγαθόν. οὐ πᾶν δέ, ἀλλὰ τὸ
 80 πρακτὸν ἀγαθόν. πρακτὸν δ' ἐστὶ τὸ ἐνδεχόμενον
 καὶ ἄλλως ἔχειν.

“Ὅτι μὲν οὖν ἡ τοιαύτη δύναμις κινεῖ τῆς ψυχῆς
 ἡ καλουμένη ὀρεξίς, φανερόν. τοῖς δὲ διαιρουσί τα
 483 b μέρη τῆς ψυχῆς ἔαν κατὰ τὰς δυνάμεις διαιρῶσι
 καὶ χωρίζωσι, πάμπολλα γίνεται, θρεπτικόν, αἰ-
 σθητικόν, νοητικόν, βουλευτικόν, ἔτι ὀρεκτικόν·
 ταῦτα γὰρ πλεόν διαφέρει ἀλλήλων ἢ τὸ ἐπιθυμη-
 5 τικόν καὶ θυμικόν. ἐπεὶ δ' ὀρέξεις γίνονται ἐναν-
 τίαι ἀλλήλαις, τοῦτο δὲ συμβαίνει ὅταν ὁ λόγος
 καὶ ἡ ἐπιθυμία ἐναντίαι ᾧσι, γίνεται δ' ἐν τοῖς
 χρόνου αἰσθησιν ἔχουσιν (ὁ μὲν γὰρ νοῦς διὰ τὸ
 μέλλον ἀνθέλκειν κελεύει, ἡ δ' ἐπιθυμία διὰ τὸ
 ἥδη· φαίνεται γὰρ τὸ ἥδη ἡδὺ καὶ ἀπλῶς ἡδὺ καὶ
 10 ἀγαθὸν ἀπλῶς, διὰ τὸ μὴ ὁρᾶν τὸ μέλλον), εἶδει
 μὲν ἔν ἃν εἴη τὸ κινεῖν τὸ ὀρεκτικόν, ἢ ὀρεκτικόν,
 πρῶτον δὲ πάντων τὸ ὀρεκτόν (τοῦτο γὰρ κινεῖ οὐ

ON THE SOUL, III. x.

really two causes, mind as well as appetite, they would produce movement in virtue of a common characteristic. But, as things are, mind is never seen to produce movement without appetite ; for choice is a form of appetite. But when a man moves according to calculation, he also moves according to choice, but appetite produces movement contrary to calculation ; for desire is a form of appetite. Again, mind is always right ; but appetite and imagination may be right or wrong. Consequently that which is desired always produces movement, but this is either good, or what seems to be good ; and not every sort of good, but only practical good. Practical good is that which is capable of being otherwise.

It is clear, then, that the capacity of the soul which is called appetite is what produces movement. But those who divide up the parts of the soul, if they divide and distinguish them according to their functions, have many divisions, nutritive, sensitive, thinking, deliberative and even craving ; for these show more difference between each other than the desiring and the passionate. But cravings are opposite to each other, and this happens wherever reason and desire are contradictory, and this occurs in creatures which are sensitive to time. (For the mind advises us to resist with a view to the future, while desire only looks to the present ; for what is momentarily pleasant seems to be absolutely pleasant and absolutely good, because desire cannot look to the future.) In form, then, the moving cause will be one, that is the appetitive faculty in so far as it is appetitive, and first of all the object craved for (for this, though not itself moving, produces movement.

Appetence
produces
movement.

488 b

κινούμενον τῷ νοηθῆναι ἢ φαντασθῆναι), ἀριθμῷ δὲ πλείω τὰ κινούμενα.

Ἐπειδὴ δ' ἐστὶ τρία, ἓν μὲν τὸ κινεῖν, δεύτερον δ' ὃ κινεῖ, τρίτον τὸ κινούμενον· τὸ δὲ κινεῖν 15 διττόν, τὸ μὲν ἀκίνητον, τὸ δὲ κινεῖν καὶ κινούμενον· ἔστι δὲ τὸ μὲν ἀκίνητον τὸ πρακτὸν ἀγαθόν, τὸ δὲ κινεῖν καὶ κινούμενον τὸ ὀρεκτικόν (κινεῖται γὰρ τὸ κινούμενον ἢ ὀρέγεται, καὶ ἡ κίνησις ὀρεξίς τις ἐστὶν ἢ ἐνέργεια), τὸ δὲ κινούμενον τὸ ζῶον· ὃ δὲ κινεῖ ὀργάνῳ ἢ ὀρεξίς, ἥδη τοῦτο σωματικόν 20 ἐστίν· διὸ ἐν τοῖς κοινοῖς σώματος καὶ ψυχῆς ἔργοις θεωρητέον περὶ αὐτοῦ. νῦν δὲ ὡς ἐν κεφαλαίῳ εἰπεῖν τὸ κινεῖν ὀργανικῶς, ὅπου ἀρχὴ καὶ τελευτὴ τὸ αὐτό, οἷον ὁ γιγγλυμός· ἐνταῦθα γὰρ τὸ κυρτόν καὶ κοῖλον τὸ μὲν τελευτὴ τὸ δ' ἀρχή· διὸ τὸ μὲν 25 ἡρεμεῖ τὸ δὲ κινεῖται, λόγῳ μὲν ἕτερα ὄντα, μεγέθει δ' ἀχώριστα· πάντα γὰρ ὥσει καὶ ἔλξει κινεῖται. διὸ δεῖ ὥσπερ ἐν κύκλῳ μένειν τι, καὶ ἐντεῦθεν ἄρχεσθαι τὴν κίνησιν. ὅλως μὲν οὖν, ὥσπερ εἴρηται, ἢ ὀρεκτικὸν τὸ ζῶον, ταύτῃ αὐτοῦ κινητικόν· ὀρεκτικὸν δὲ οὐκ ἄνευ φαντασίας· φαντασία 30 δὲ πᾶσα ἢ λογιστικὴ ἢ αἰσθητικὴ. ταύτης μὲν οὖν καὶ τὰ ἄλλα ζῶα μετέχει.

XI. Σκεπτέον δὲ καὶ περὶ τῶν ἀτελῶν, τί τὸ 484 a κινεῖν ἐστίν, οἷς ἀφ' ἑνὸς μόνου ὑπάρχει αἰσθησις,

ON THE SOUL, III. x.—xi.

by being thought of or imagined), but the actual moving causes are plural.

But there are three things to be considered : first the moving cause, secondly the means by which it produces movement, and thirdly the thing moved. The moving cause has two senses, one unmoved and one producing movement and moving ; but the practical good is unmoved ; while the moving and the moved are the appetite (for that which is moved moves, in so far as there is a craving, and the movement is a form of appetite actualized), but the thing moved is the living creature ; the instrument of moving is the craving, and this is bodily ; so it must be considered among the functions which are common to body and soul. But for the present it is sufficient to summarize by saying that movement by means of instruments is where the beginning and end coincide, as in a ball-and-socket joint. For there the convex surface (the ball) and the concave surface (the socket) are respectively the end and the beginning of the movement ; consequently the latter is at rest while the former moves. Logically they are two different things, but in position inseparable ; for all movement consists of pushing and pulling ; so that as in a wheel one point (the centre) remains fixed, and from that point the movement is initiated. Speaking generally then, as has been said, in so far as the living creature is subject to appetite, it is also subject to movement ; but appetite does not exist without imagination, and all imagination involves either calculation or sensation. This latter all living creatures share.

XI. We must now consider what the moving principle is in the case of those imperfect animals, whose

How movement takes place.

How is movement possible in

434 a

πότερον ἐνδέχεται φαντασίαν ὑπάρχειν τούτοις, ἢ
 οὐ, καὶ ἐπιθυμίαν. φαίνεται γὰρ λύπη καὶ ἡδονὴ
 ἐνοῦσα. εἰ δὲ ταῦτα, καὶ ἐπιθυμίαν ἀνάγκη.
 φαντασία δὲ πῶς ἂν ἐνείη; ἢ ὥσπερ καὶ κινεῖται
 5 ἀορίστως, καὶ ταῦτ' ἔνεστι μὲν, ἀορίστως δ'
 ἔνεστιν. ἡ μὲν οὖν αἰσθητικὴ φαντασία, ὥσπερ
 εἴρηται, καὶ ἐν τοῖς ἄλλοις ζώοις ὑπάρχει, ἡ δὲ
 βουλευτικὴ ἐν τοῖς λογιστικοῖς· πότερον γὰρ πρά-
 ξει τόδε ἢ τόδε, λογισμοῦ ἡδὴ ἐστὶν ἔργον· καὶ
 ἀνάγκη ἐνὶ μετρεῖν· τὸ μεῖζον γὰρ διώκει. ὥστε
 10 δύναται ἐν ἐκ πλειόνων φαντασμάτων ποιεῖν. καὶ
 αἴτιον τοῦτο τοῦ δόξαν μὴ δοκεῖν ἔχειν, ὅτι τὴν
 ἐκ συλλογισμοῦ οὐκ ἔχει, αὕτη δὲ ἐκείνην. διὸ
 τὸ βουλευτικὸν οὐκ ἔχει ἢ ὄρεξις. νικᾷ δ' ἐνίοτε
 καὶ κινεῖ τὴν βούλησιν· ὅτε δ' ἐκείνη ταύτην,
 ὥσπερ σφαῖρα, ἢ ὄρεξις τὴν ὄρεξιν, ὅταν ἀκρασία
 15 γένηται. φύσει δὲ αἰεὶ ἢ ἄνω ἀρχικωτέρα καὶ
 κινεῖ, ὥστε τρεῖς φορές ἡδὴ κινεῖσθαι. τὸ δ'
 ἐπιστημονικὸν οὐ κινεῖται, ἀλλὰ μένει. ἐπεὶ δ' ἡ
 μὲν καθόλου ὑπόληψις καὶ λόγος, ἡ δὲ τοῦ καθ'
 ἕκαστα (ἢ μὲν γὰρ λέγει ὅτι δεῖ τὸν τοιοῦτον τὸ
 τοιόνδε πράττειν, ἢ δὲ ὅτι τόδε τὸ νῦν τοιόνδε,

ON THE SOUL, III. xi.

only sensation is that of touch, and whether it is possible for them to have imagination or not, and desire. For it is evident that they are liable to pain and pleasure. If they have these they must also have desire. But in what sense could they have imagination? Or, just as they move, but only in an indeterminate fashion, do they also have imagination, but only in an indeterminate fashion? Imagination in the form of sense exists, as we have said, in other animals, but deliberative imagination only in those which can reason; for it is the function of reason to decide whether one shall do this or that, and one must measure by a single standard; for one pursues the greater good. So one can make one mental picture out of a number of images; and the reason why animals are not considered capable of having opinion is that they have not the type of imagination which arises from inference; but the possession of the power of reasoning implies the other. This is why appetite does not imply capacity for deliberation. In fact it sometimes conquers and moves the will. But when one appetite controls another, as one celestial sphere controls another, is the occasion when incontinence occurs. But in nature the upper sphere always asserts the larger measure of control and produces the movement, so that there are three movements combined in one. But the faculty of knowledge does not move but remains still. But there is such a thing as belief in and argument from the universal, and also the belief in and argument from the particular. (The former asserts that a man in such a position should act in such a way, but the latter asserts that this is matter of such a kind and that I am a man in such a position.) It is this

the lower
form of
animal life?

Movement
may be
complicated
by a conflict
of impulses.

434 a

20 καὶ γὰρ δὲ τοιοῦσδε) ἤδη αὕτη κινεῖ ἡ δόξα, οὐχ ἡ καθόλου. ἡ ἄμφω, ἀλλ' ἡ μὲν ἡρεμοῦσα μᾶλλον, ἡ δ' οὐ.

XII. Τὴν μὲν οὖν θρεπτικὴν ψυχὴν ἀνάγκη πᾶν ἔχειν ὅτι περ ἂν ζῇ καὶ ψυχὴν ἔχη ἀπὸ γενέσεως μέχρι φθορᾶς· ἀνάγκη γὰρ τὸ γενόμενον αὐξήσιν
 25 ἔχειν καὶ ἀκμὴν καὶ φθίσιν, ταῦτα δ' ἄνευ τροφῆς ἀδύνατον· ἀνάγκη ἄρα ἐνεῖναι τὴν θρεπτικὴν δύναμιν ἐν πᾶσι τοῖς φυομένοις καὶ φθίνουσιν. αἰσθῆσιν δ' οὐκ ἀναγκαῖον ἐν ἅπασιν τοῖς ζῶσιν· οὔτε γὰρ ὅσων τὸ σῶμα ἀπλοῦν, ἐνδέχεται ἀφήν
 ἔχειν, οὔτε ἄνευ ταύτης οἶόν τε οὐθὲν εἶναι ζῶον·
 30 οὔτε ὅσα μὴ δεκτικὰ τῶν εἰδῶν ἄνευ τῆς ὕλης. τὸ δὲ ζῶον ἀναγκαῖον αἰσθῆσιν ἔχειν, εἰ μὴθὲν μάτην ποιεῖ ἡ φύσις. ἔνεκά του γὰρ πάντα ὑπάρχει τὰ φύσει, ἢ συμπτώματα ἔσται τῶν ἔνεκά του. εἰ οὖν πᾶν σῶμα πορευτικὸν μὴ ἔχον
 434 b αἰσθῆσιν, φθείροιτο ἂν καὶ εἰς τέλος οὐκ ἂν ἔλθοι, ὃ ἐστὶ φύσεως ἔργον· πῶς γὰρ θρέψεται; τοῖς μὲν γὰρ μονίμοις ὑπάρχει τὸ ὄθεν πεφύκασιν· οὐχ οἶόν τε δὲ σῶμα ἔχειν μὲν ψυχὴν καὶ νοῦν κριτικόν, αἰσθῆσιν δὲ μὴ ἔχειν, μὴ μόνιμον ὄν, γεννητὸν δέ.
 5 ἀλλὰ μὴν οὐδὲ ἀγέννητον· διὰ τί γὰρ ἔξει; ἡ γὰρ τῇ ψυχῇ βέλτιον ἢ τῷ σώματι. νῦν δ' οὐδέτερον· ἡ μὲν γὰρ οὐ μᾶλλον νοήσει, τὸ δ' οὐθὲν ἔσται

ON THE SOUL, III. XI.—XII.

latter opinion which produces movement and not the opinion of the universal. Or else it is both, but the opinion of the universal tends to move less, the other more.

XII. Every living thing must have the nutritive ^{The soul and life.} soul that it may live, and have a soul from its birth until its death; for that which is born must have growth, a highest point of development and decay, and these things are impossible without food. The nutritive capacity must then exist in all things which grow and decay. But sensation is not necessary to all living creatures; it is not necessary to those which have simple bodies to have a sense of touch, nor without this can any animal exist; nor need those living things have a sense of touch which are not receptive of forms without matter. But the living animal must have sensation, if it is a fact that nature does nothing in vain. For everything in nature exists for a purpose, except for those accidental properties which subscribe to a purpose. An animal capable of moving from place to place, if it had no sensation, would be destroyed, and would not reach the end which is its natural function; for how could it be nourished? Stationary living things can draw their food from the source from which they were born, but it is impossible for the body to possess a soul and a mind capable of judgement without having sensation, if it is not stationary but generated by birth. Nor could it lack sensation even if it is not generated by birth; for what would be the object of its having it? If it possessed sensation it would necessarily be the better for it either in soul or in body; but in our present case it will not benefit in either way; for the former will not think any better for this reason, and

484 b

μᾶλλον δι' ἐκεῖνο. οὐθὲν ἄρα ἔχει ψυχὴν σῶμα
μὴ μόνιμον ἄνευ αἰσθήσεως.

- Ἄλλὰ μὴν εἶγε αἰσθησιν ἔχει, ἀνάγκη τὸ σῶμα
10 εἶναι ἢ ἀπλοῦν ἢ μικτόν. οὐχ οἷόν τε δὲ ἀπλοῦν·
ἀφήν γὰρ οὐχ ἔξει, ἔστι δὲ ἀνάγκη ταύτην ἔχειν.
τοῦτο δὲ ἐκ τῶνδε δῆλον. ἐπεὶ γὰρ τὸ ζῶον
σῶμα ἐμψυχόν ἐστι, σῶμα δὲ ἅπαν ἀπτόν, ἀπτόν
δὲ τὸ αἰσθητόν ἀφῆ, ἀνάγκη καὶ τὸ τοῦ ζώου
σῶμα ἀπτικὸν εἶναι, εἰ μέλλει σῶζεσθαι τὸ ζῶον.
15 αἱ γὰρ ἄλλαι αἰσθήσεις δι' ἐτέρων αἰσθάνονται,
οἷον ὄσφρησις ὄψις ἀκοή· ἀπτόμενον δέ, εἰ μὴ
ἔξει αἰσθησιν, οὐ δυνήσεται τὰ μὲν φεύγειν τὰ δὲ
λαβεῖν. εἰ δὲ τοῦτο, ἀδύνατον ἔσται σῶζεσθαι τὸ
ζῶον. διὸ καὶ ἡ γεῦσις ἐστὶν ὥσπερ ἀφή τις·
τροφῆς γάρ ἐστιν, ἡ δὲ τροφή τὸ σῶμα τὸ ἀπτόν.
20 ψόφος δὲ καὶ χρώμα καὶ ὁσμὴ οὐ τρέφει, οὐδὲ
ποιεῖ οὐτ' αὔξησιν οὔτε φθίσιν. ὥστε καὶ τὴν
γεῦσιν ἀνάγκη ἀφήν εἶναί τινα, διὰ τὸ τοῦ ἀπτοῦ
καὶ θρεπτικοῦ αἰσθησιν εἶναι. αὐταὶ μὲν οὖν
ἀναγκαῖαι τῷ ζώῳ, καὶ φανερόν ὅτι οὐχ οἷόν τε
ἄνευ ἀφῆς εἶναι ζῶον.
25 Αἱ δὲ ἄλλαι τοῦ τε εὖ ἔνεκα καὶ γένει ζώων
ἤδη οὐ τῷ τυχόντι, ἀλλὰ τισίν, οἷον τῷ πορευτικῷ
ἀνάγκη ὑπάρχειν· εἰ γὰρ μέλλει σῶζεσθαι, οὐ
μόνον δεῖ ἀπτόμενον αἰσθάνεσθαι ἀλλὰ καὶ ἀποθελ.
τοῦτο δ' ἂν εἴη, εἰ διὰ τοῦ μεταξὺ αἰσθητικὸν εἶη

ON THE SOUL, III. XII.

the latter will be no better for the possession. No body, then, which is not stationary possesses a soul without sensation.

Further, if it does possess sensation, the body must be either simple or compound. But it cannot be simple; for in that case it will have no sense of touch, and this is indispensable to it. This is obvious from the following considerations. For since the living animal is a body possessing soul, and every body is tangible, and that which is apprehended by touch is the sensible object, it follows that the body of the animal must have the faculty of touch if the animal is to survive. For the other senses perceive through the medium of something else such as smell, vision and hearing; but the animal when it touches, if it has no sensation, will not be able to avoid some things and seize others. In that case it will be impossible for the animal to survive. And so tasting is a form of touching; for it belongs to food, but food is a tangible body. Sound, colour and smell supply no food, nor do they produce growth and decay. So that taste must be some form of touch, because it is the perception of what is touched and nutritive. These qualities are then essential to the living animal, and it is obvious that the animal cannot exist without a sense of touch.

But there are other qualities necessary to living well, which do not belong to any class of living creatures taken at random, but only to certain ones, as for instance they belong to the animal which is capable of locomotion; for if it is to survive, not only must it perceive when in contact, but also from a distance. And this will occur only if it exercises its perceptive faculty through a medium in which the

Living
well.

434 b

τῷ ἐκεῖνο μὲν ὑπὸ τοῦ αἰσθητοῦ πάσχειν καὶ
 80 κινεῖσθαι, αὐτὸ δ' ὑπ' ἐκείνου. ὥσπερ γὰρ τὸ
 κινεῖν κατὰ τόπον μέχρι τοῦ μεταβάλλειν ποιεῖ,
 καὶ τὸ ὥσαν ἕτερον ποιεῖ ὥστε ὠθεῖν, καὶ ἔστι
 διὰ μέσου ἢ κίνησις, καὶ δὴ τὸ μὲν πρῶτον κινεῖν
 ὠθεῖ οὐχ ὠθούμενον, τὸ δ' ἔσχατον μόνον ὠθεῖται

485 a οὐκ ὥσαν, τὸ δὲ μέσον ἄμφω, πολλὰ δὲ μέσα,
 οὕτως ἐπ' ἀλλοιώσεως, πλὴν ὅτι μένοντος ἐν τῷ
 αὐτῷ τόπῳ ἀλλοιοῖ, οἷον εἰ εἰς κηρὸν βάψει τις,
 μέχρι τούτου ἐκινήθη, ἕως ἔβαιβεν· λίθος δὲ οὐδέν,
 ἀλλ' ὕδωρ μέχρι πόρρω. ὁ δ' ἀήρ ἐπὶ πλείστον
 5 κινεῖται καὶ ποιεῖ καὶ πάσχει, ἐὰν μένη καὶ εἰς
 ἤ. διὸ καὶ περὶ ἀνακλάσεως βέλτιον ἢ τὴν ὄψιν
 ἐξιούσαν κλᾶσθαι, τὸν αέρα πάσχειν ὑπὸ τοῦ
 σχήματος καὶ χρώματος, μέχρι περ οὗ ἂν εἰς ἤ.
 ἐπὶ δὲ τοῦ λείου ἐστὶν εἰς· διὸ πάλιν οὗτος τὴν
 ὄψιν κινεῖ, ὥσπερ ἂν εἰ τὸ ἐν τῷ κηρῷ σημεῖον
 10 διεδίδοδοτο μέχρι τοῦ πέρατος.

XIII. Ὅτι δ' οὐχ οἷόν τε ἀπλοῦν εἶναι τὸ τοῦ
 ζώου σῶμα, φανερόν, λέγω δ' οἷον πύρινον ἢ
 ἀέρινον. ἄνευ μὲν γὰρ ἀφῆς οὐδεμίαν ἐνδέχεται
 ἄλλην αἴσθησιν ἔχειν· τὸ γὰρ σῶμα ἀπτικὸν τὸ
 15 ἔμφυχον πᾶν, ὥσπερ εἴρηται. τὰ δὲ ἄλλα ἕξω
 γῆς αἰσθητήρια μὲν ἂν γένοιτο, πάντα δὲ τῷ δι'
 ἑτέρου αἰσθάνεσθαι ποιεῖ τὴν αἴσθησιν καὶ διὰ τῶν
 198

ON THE SOUL, III. XII.—XIII.

animal is affected, and is moved by the sensible object, and the sensible object by the medium. For that which produces movement in space causes change up to a certain point, and that which has given a push causes something else to push also, and movement takes place through a medium, and again that which initiates a movement pushes without being pushed, but the last link in the chain is pushed without pushing, but the intermediate link both pushes and is pushed, and there may be many such intermediate links. Exactly the same thing occurs in change of state, except that it suffers change while remaining in the same place, just as if one were to dip something into wax, the movement would occur in the wax just so far as one dipped it. Now stone would not move at all, but water would be affected to a great distance. But it is air that moves, acts, and is acted upon most, if it remains still and is continuous. For that reason in connexion with the reflection of light it is better to suppose, not that the ray leaving the eye is reflected, but rather that the air is affected by the shape and colour, so long as it remains continuous. And it is continuous supposing that it is smooth; then the air in its turn moves the vision, just as if the impression on the wax had passed right through to the other side.

XIII. It is obvious that the body of the animal cannot consist of a single element such as fire or air. For without a sense of touch it is impossible to have any other sensation; for every body possessing soul has the faculty of touch, as has been said. Now except for earth, all the other elements could produce sense organs, but all these produce sensation by means of something else, that is through media.

Touch is the most elementary and indispensable soul faculty.

435 a

μεταξύ. ἡ δ' ἀφή τῷ αὐτῶν ἄπτεσθαί ἐστιν, διό
καὶ τοῦνομα τοῦτο ἔχει. καίτοι καὶ τὰ ἄλλα
αἰσθητήρια ἀφή αἰσθάνεται, ἀλλὰ δι' ἑτέρου· αὕτη
20 δὲ δοκεῖ μόνῃ δι' αὐτῆς, ὥστε τῶν μὲν τοιούτων
στοιχείων οὐθὲν ἂν εἴη σῶμα τοῦ ζῶον, οὐδὲ δὴ
γῆινον. πάντων γὰρ ἡ ἀφή τῶν ἄπτων ἐστὶν
ὥσπερ μεσότης, καὶ δεκτικὸν τὸ αἰσθητήριον οὐ
μόνον ὅσαι διαφοραὶ γῆς εἰσὶν, ἀλλὰ καὶ θερμοῦ
καὶ ψυχροῦ καὶ τῶν ἄλλων ἄπτων ἀπάντων. καὶ

25 διὰ τοῦτο τοῖς ὁστοῖς καὶ ταῖς θριξὶ καὶ τοῖς

435 b τοιούτοις μορίοις οὐκ αἰσθανόμεθα, ὅτι γῆς ἐστίν.

καὶ τὰ φυτὰ διὰ τοῦτο οὐδεμίαν ἔχει αἴσθησιν, ὅτι
γῆς ἐστίν· ἄνευ δὲ ἀφῆς οὐδεμίαν οἶον τε ἄλλην
ὑπάρχειν, τοῦτο δὲ τὸ αἰσθητήριον οὐκ ἔστιν οὔτε
γῆς οὔτε ἄλλον τῶν στοιχείων οὐδενός. φανερόν

5 τοίνυν ὅτι ἀνάγκη μόνῃς ταύτης στερισκόμενα τῆς
αἰσθήσεως τὰ ζῶα ἀποθνήσκουσιν· οὔτε γὰρ ταύτην
ἔχειν οἶον τε μὴ ζῶον, οὔτε ζῶον ὃν ἄλλην ἔχειν
ἀνάγκη πλὴν ταύτης. καὶ διὰ τοῦτο τὰ μὲν ἄλλα
αἰσθητὰ ταῖς ὑπερβολαῖς οὐ διαφθείρει τὸ ζῶον,
οἶον χρῶμα καὶ ψόφος καὶ ὁσμή, ἀλλὰ μόνον τὰ

10 αἰσθητήρια, ἂν μὴ κατὰ συμβεβηκός, οἶον ἂν ἅμα
τῷ ψόφῳ ὥσις γένηται καὶ πληγὴ, καὶ ὑπὸ ὀρα-
μάτων καὶ ὁσμῆς ἕτερα κινεῖται, ἃ τῇ ἀφῇ φθείρει.
καὶ ὁ χυμὸς δὲ ἢ ἅμα συμβαίνειν ἄπτικόν εἶναι,
ταύτη φθείρει. ἡ δὲ τῶν ἄπτων ὑπερβολή, οἶον
θερμῶν καὶ ψυχρῶν καὶ σκληρῶν, ἀναιρεῖ τὸ ζῶον·

15 παντὸς μὲν γὰρ αἰσθητοῦ ὑπερβολὴ ἀναιρεῖ τὸ
αἰσθητήριον, ὥστε καὶ τὸ ἄπτὸν τὴν ἀφήν, ταύτη
δὲ ὥρισται τὸ ζῆν· ἄνευ γὰρ ἀφῆς δέδεικται ὅτι

ON THE SOUL, III. XIII.

But the sense of touch arises from touching the objects themselves, and that is why it has its name. The other sense organs perceive by touch too, but through a medium. This alone seems to perceive by itself, so that no one of these elements could compose the animal body. Nor could earth. For the touching of all tangible objects is a kind of mean, and the sense organ is receptive not only in as many ways as there are differences of earth, but also of heat, cold, and all other tangible things. For this reason we do not perceive by our bones and hair, and such parts of the body, because they are composed of earth. And for this reason plants have no sensation, because they are composed of earth. But without touch no other sensation can exist, but this sense organ is neither composed of earth, nor of any other of the elements. It is obvious, then, that deprived of this, their only sensation, animals must die ; for it is impossible for anything but an animal to possess this, nor need an animal possess any sense but this. And for this reason the other sensible objects do not destroy the animal by excess, such as colour and sound and smell, but only the sense organs, except incidentally, as for instance when a thrust or blow is delivered at the same time as the sound, and other movements are produced by sight and smell, which destroy by touch. Flavour, again, destroys by contact in so far as the animal happens to be affected by touch. But the excess of tangible objects, such as hot, cold, and hard, destroys the animal ; for excess in any sensible object destroys the sense organ ; so the tangible object destroys touch, and by this living is determined, for it has been admitted that without

485 b

ἀδύνατον εἶναι ζῶον. διὸ ἡ τῶν ἀπτῶν ὑπερβολή
 οὐ μόνον τὸ αἰσθητήριον φθείρει, ἀλλὰ καὶ τὸ
 ζῶον, ὅτι ἀνάγκη μόνην ἔχειν ταύτην. τὰς δ'
 20 ἄλλας αἰσθήσεις ἔχει τὸ ζῶον, ὥσπερ εἴρηται, οὐ
 τοῦ εἶναι ἕνεκα ἀλλὰ τοῦ εὔ, οἷον ὄψιν, ἐπεὶ ἐν
 αἴρι καὶ ὕδατι, ὅπως ὄρα, ὅλως δ' ἐπεὶ ἐν διαφανεί,
 γεῦσίν τε διὰ τὸ ἡδὺ καὶ λυπηρόν, ἵνα αἰσθάνηται
 τὸ ἐν τροφῇ καὶ ἐπιθυμῇ καὶ κινῆται, ἀκοήν
 25 δὲ ὅπως σημαίνει τι αὐτῷ, γλώτταν δὲ ὅπως
 σημαίνει τι ἑτέρῳ.

ON THE SOUL, III. XIII.

touch the animal cannot exist. Therefore excess in the objects touched not only destroys the sense organ, but also the animal, because touch is the one sense which the animal must possess. But the animal possesses the other senses, as has been said, not in order that it may exist, but that its existence may be good ; for instance the animal has sight, when it lives in air or water, or generally in a transparent medium, in order that it may see ; and it has taste because of what is sweet and bitter, in order that it may perceive these qualities in food and may desire and be moved ; and hearing that it may interpret something to itself, and tongue that it may interpret something to another.

ON SENSE AND SENSIBLE
OBJECTS

INTRODUCTION

THIS treatise is the first of a series known as *Parva Naturalia*, which professes to deal with the special activities of the soul. The *De Sensu* treats of Sense and Sensible Objects, but incompletely, as touch is omitted altogether, and the treatment of hearing is very slight. From the point of view of the modern reader the account is not altogether satisfactory, because Aristotle's *Physics* and *Physiology* are very remote from the thought of to-day. But it does not follow that the account he gives is devoid of interest. The first five chapters deal with the senses themselves and the objects of sense. The author attempts to give a real account of the nature of the latter, and although his meaning is often obscure and his *Metaphysics* quite foreign to our modes of thought, he makes it clear that he regards sensible objects as having a real existence apart from the organs of sense which perceive them.

The last two chapters raise some very interesting questions, although they can hardly be said to answer them satisfactorily. Of these the most important are: "Can there be an imperceptible magnitude?" and "Can two objects of sense be perceived simultaneously?" To both of these questions Aristotle answers No, though with certain qualifications.

ΠΕΡΙ ΑΙΣΘΗΣΕΩΣ ΚΑΙ ΑΙΣΘΗΤΩΝ

486 a I. Ἐπεὶ δὲ περὶ ψυχῆς καθ' αὐτὴν διώρισται
καὶ περὶ τῶν δυνάμεων ἐκάστης κατὰ μόριον
αὐτῆς, ἐχόμενόν ἐστι ποιήσασθαι τὴν ἐπίσκεψιν
περὶ τῶν ζώων καὶ τῶν ζῶν ἐχόντων ἀπάντων,
5 τίνες εἰσὶν ἴδια καὶ τίνες κοινὰ πράξεις αὐτῶν.
τὰ μὲν οὖν εἰρημένα περὶ ψυχῆς ὑποκείσθω, περὶ
δὲ τῶν λοιπῶν λέγωμεν, καὶ πρῶτον περὶ τῶν
πρώτων. φαίνεται δὲ τὰ μέγιστα, καὶ τὰ κοινὰ
καὶ τὰ ἴδια τῶν ζώων, κοινὰ τῆς ψυχῆς ὄντα καὶ
τοῦ σώματος, οἷον αἴσθησις καὶ μνήμη καὶ θυμὸς
10 καὶ ἐπιθυμία καὶ ὅλως ὄρεξις, καὶ πρὸς τούτοις
ἡδονή τε καὶ λύπη· καὶ γὰρ ταῦτα σχεδὸν ὑπ-
άρχει πᾶσι τοῖς ζώοις. πρὸς δὲ τούτοις τὰ μὲν
πάντων ἐστὶ τῶν μετεχόντων ζωῆς κοινὰ, τὰ δὲ
τῶν ζώων ἐνίοις. τυγχάνουσι δὲ τούτων τὰ
μέγιστα τέτταρες οὔσαι συζυγίαι τὸν ἀριθμόν, οἷον
15 ἐγρήγορις καὶ ὕπνος, καὶ νεότης καὶ γῆρας, καὶ
ἀναπνοή καὶ ἐκπνοή, καὶ ζωὴ καὶ θάνατος· περὶ
ὧν θεωρητέον, τί τε ἕκαστον αὐτῶν, καὶ διὰ τίνας
αἰτίας συμβαίνει.

Φυσικοῦ δὲ καὶ περὶ ὑγείας καὶ νόσου τὰς
πρώτας ἰδεῖν ἀρχάς· οὔτε γὰρ ὑγίειαν οὔτε νόσον
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ON SENSE AND SENSIBLE OBJECTS

I. Since our account of the soul itself is complete, and also of the faculties existing in each part of it, our next task is to examine living creatures and all things which have animal life, and to discover what are their peculiar and what are their common activities. All that has already been said about the soul is to be assumed, but let us now discuss the remaining questions, dealing first of all with those which naturally come first. The most important characteristics of animals, both general and special, appear to be those which are common both to soul and body, such as sensation, memory, passion, desire, and appetite generally, and in addition to these pleasure and pain ; for these belong to almost all living creatures. In addition to these some are common to all those creatures that share in animal life, and others are peculiar to certain animals. The most important of these are the four pairs, namely waking and sleep, youth and age, breathing in and out, life and death ; about these we have to consider what each of them is, and what are the reasons for their existence.

It is further the duty of the physical philosopher to reflect on the first principles of disease and health ; for neither health nor disease can be the properties of

On subject
is the
special
activities
of the soul.

Disease and
health.

438 a

οἷόν τε γίνεσθαι τοῖς ἐστερημένοις ζωῆς. διὸ
 20 σχεδὸν τῶν τε περὶ φύσεως οἱ πλείστοι καὶ τῶν
 ἱατρῶν οἱ φιλοσοφωτέως τὴν τέχνην μετιόντες,
 438 b οἱ μὲν τελευτῶσιν εἰς τὰ περὶ ἱατρικῆς, οἱ δ' ἐκ
 τῶν περὶ φύσεως ἄρχονται περὶ τῆς ἱατρικῆς.

Ὅτι δὲ τὰ λεχθέντα κοινὰ τῆς τε ψυχῆς ἐστὶ
 καὶ τοῦ σώματος, οὐκ ἄδηλον. πάντα γὰρ τὰ
 μὲν μετ' αἰσθήσεως συμβαίνει, τὰ δὲ δι' αἰσθήσεως.
 5 ἓν ἓν δὲ τὰ μὲν πάθη ταύτης ὄντα τυγχάνει, τὰ δ'
 ἕξεις, τὰ δὲ φυλακαὶ καὶ σωτηρίαι, τὰ δὲ φθοραὶ
 καὶ στερήσεις. ἡ δ' αἰσθησις ὅτι διὰ σώματος
 γίνεται τῇ ψυχῇ, δῆλον καὶ διὰ τοῦ λόγου καὶ
 τοῦ λόγου χωρὶς.

Ἀλλὰ περὶ μὲν αἰσθήσεως καὶ τοῦ αἰσθάνεσθαι,
 τί ἐστὶ καὶ διὰ τί συμβαίνει τοῖς ζώοις τοῦτο τὸ
 10 πάθος, εἴρηται πρότερον ἐν τοῖς περὶ ψυχῆς. τοῖς
 δὲ ζώοις, ἥ μὲν ζῶον ἕκαστον, ἀνάγκη ὑπάρχειν
 αἰσθῆσιν· τούτῳ γὰρ τὸ ζῶον εἶναι καὶ μὴ ζῶον
 διορίζομεν. ἰδίᾳ δ' ἤδη καθ' ἕκαστον ἡ μὲν ἀφή
 καὶ γεῦσις ἀκολουθεῖ πᾶσιν ἐξ ἀνάγκης, ἡ μὲν
 15 ἀφή διὰ τὴν εἰρημένην αἰτίαν ἐν τοῖς περὶ ψυχῆς,
 ἡ δὲ γεῦσις διὰ τὴν τροφήν· τὸ γὰρ ἡδὺ διακρίνει
 καὶ τὸ λυπηρὸν αὕτη περὶ τὴν τροφήν, ὥστε τὸ
 μὲν φεύγειν τὸ δὲ διώκειν, καὶ ὅλως ὁ χυμός ἐστι
 τοῦ θρεπτικοῦ μορίου πάθος. αἱ δὲ διὰ τῶν ἔξωθεν
 αἰσθήσεις τοῖς πορευτικοῖς αὐτῶν, οἷον ὄσφρησις
 20 καὶ ἀκοή καὶ ὄψις, πᾶσι μὲν τοῖς ἔχουσι σωτηρίας
 ἕνεκεν ὑπάρχουσιν, ὅπως διώκωσί τε προαισθανό-
 μενα τὴν τροφήν καὶ τὰ φαῦλα καὶ τὰ φθαρτικά

a 413 b etc.

b 434 a, ch. 12.

ON SENSE AND SENSIBLE OBJECTS, I.

things deprived of life. For this reason most inquirers into nature, and those doctors who pursue their craft with scientific interest, are alike. For the former at the end of their inquiries reach a discussion of medicine, while the latter begin their investigations into medicine with an inquiry into nature.

It is obvious that the characteristics already mentioned belong both to soul and body. For all of them appear either in conjunction with sensation or arise through sensation : some again are affections of sensations and some are regular conditions ; some again tend to guard and preserve life, and others to destroy and extinguish it. That sensation is felt by the soul through the medium of the body is obvious on theoretical grounds and also apart from theory.

Connexion
of body
and soul.

However we have already treated of sensation and feeling in our work *On the Soul*,^a what they are, and why this affection appears among animals. Living creatures as such must possess sensation. For it is by this that we differentiate between living creatures and those which are not alive ; and in each individual case touch and taste necessarily accompany them all, touch for the reason given in our work *On the Soul*,^b and taste for the acquisition of food ; for it is taste which discriminates between pleasant and unpleasant in food, so that the one is avoided and the other pursued, and speaking generally flavour is an affection of the nutritive part of the soul. But those sensations which reach animals capable of locomotion through an outside medium, such as smell, hearing and vision, belong to all those that possess them for the sake of safety, in order that they may be aware of their food before they pursue it, and may avoid what is inferior or destructive,

Sensation
is essential
to the living
creature.

437^a φεύγωσι, τοῖς δὲ καὶ φρονήσεως τυγχάνουσι τοῦ
εὖ ἕνεκα· πολλὰς γὰρ εἰσαγγέλλουσι διαφοράς, ἐξ
ᾧ ἢ τε τῶν νοητῶν ἐγγίνεται φρόνησις καὶ ἡ
τῶν πρακτῶν.

Αὐτῶν δὲ τούτων πρὸς μὲν τὰ ἀναγκαῖα κρείτ-
5 των ἢ ὄψις καὶ καθ' αὐτήν, πρὸς δὲ νοῦν καὶ κατὰ
συμβεβηκὸς ἢ ἀκοή. διαφορὰς μὲν γὰρ πολλὰς
εἰσαγγέλλει καὶ παντοδαπὰς ἡ τῆς ὄψεως δύναμις
διὰ τὸ πάντα τὰ σώματα μετέχειν χρώματος, ὥστε
καὶ τὰ κοινὰ διὰ ταύτης αἰσθάνεσθαι μάλιστα
(λέγω δὲ κοινὰ σχῆμα, μέγεθος, κίνησιν, ἀριθμόν).
10 ἡ δ' ἀκοή τὰς τοῦ ψόφου διαφορὰς μόνον, ὀλίγοις
δὲ καὶ τὰς τῆς φωνῆς. κατὰ συμβεβηκὸς δὲ πρὸς
φρόνησιν ἡ ἀκοή πλεῖστον συμβάλλεται μέρος. ὁ
γὰρ λόγος αἰτιὸς ἐστὶ τῆς μαθήσεως ἀκουστός
ᾧ, οὐ καθ' αὐτὸν ἀλλὰ κατὰ συμβεβηκός· ἐξ
ὀνομάτων γὰρ σύγκειται, τῶν δ' ὀνομάτων ἕκαστον
15 σύμβολόν ἐστιν. διόπερ φρονιμώτεροι τῶν ἐκ
γενετῆς ἐστερημένων εἰσὶν ἑκατέρας τῆς αἰσθήσεως
οἱ τυφλοὶ τῶν ἐνεῶν καὶ κωφῶν.

II. Περὶ μὲν οὖν τῆς δυνάμεως ἣν ἔχει τῶν αἰ-
σθήσεων ἑκάστη, πρότερον εἴρηται. τοῦ δὲ σώμα-
20 τος ἐν οἷς ἐγγίγνεσθαι πέφυκεν αἰσθητηρίοις, νῦν¹
μὲν ζητοῦσι κατὰ τὰ στοιχεῖα τῶν σωμάτων· οὐκ
εὐποροῦντες δὲ πρὸς τέτταρα πέντ' οὕσας συνάγειν,
γλίσχονται περὶ τῆς πέμπτης. ποιοῦσι δὲ πάντες
τὴν ὄψιν πυρὸς διὰ τὸ πάθους τινὸς ἀγνοεῖν τὴν

¹ ἐνιοι B.

ON SENSE AND SENSIBLE OBJECTS, I.—II.

while in the case of those that have thinking power these senses exist for the sake of well-being ; for they give warning of many differences, from which arise understanding both of the objects of thought and of the affairs of practical life.

Of these faculties, for the mere necessities of life and in itself, sight is the more important, but for the mind and accidentally hearing is the more important. For the faculty of sight gives warning of many differences of all kinds, because all bodies have a share of colour, so that by this medium the soul perceives most of the common sensibles. (By common I mean such as shape, size, movement and number.) But hearing only records differences of sound, and to a few living creatures differences of voice. Accidentally, then, hearing makes the largest contribution to wisdom. For the spoken word, which is responsible for all instruction, is heard ; but this does not belong to hearing in itself but only accidentally, because speech is composed of words, and each word is a symbol. Consequently, of those who have been deprived of one sense or the other from birth, the blind are more intelligent than the deaf and the dumb.

II. Concerning the capacity which each of these senses has, we have already spoken. But when they consider in what bodily sense-organs each of these senses naturally develops, modern thinkers seek to refer them to the elements of which the body is composed. But finding it difficult to bring the four elements into harmony with the five senses, they make anxious inquiry about the fifth. They all make vision consist of fire, because they do not understand the reason of one of the peculiarities of

Sight and hearing.

Are the senses composed of the elements ?

437 a

αἰτίαν· θλιβομένου γὰρ καὶ κινουμένου τοῦ ὀφ-
 25 θαλμοῦ φαίνεται πῦρ ἐκλάμπειν· τοῦτο δ' ἐν τῷ
 σκότει πέφυκε συμβαίνειν, ἢ τῶν βλεφάρων ἐπι-
 κεκαλυμμένων· γίνεται γὰρ καὶ τότε σκότος. ἔχει
 δ' ἀπορίαν τοῦτο καὶ ἑτέραν. εἰ γὰρ μὴ ἔστι
 λανθάνειν αἰσθανόμενον καὶ ὀρώντα ὀρώμενόν τι,
 ἀνάγκη ἄρ' αὐτὸν ἑαυτὸν ὀρᾶν τὸν ὀφθαλμόν. διὰ
 30 τί οὖν ἡρεμοῦντι τοῦτ' οὐ συμβαίνει; τὰ δ' αἷτια
 τούτου, καὶ τῆς ἀπορίας καὶ τοῦ δοκεῖν πῦρ εἶναι
 τὴν ὄψιν, ἐντεῦθεν ληπτέον. τὰ γὰρ λεῖα πέφυκεν
 ἐν τῷ σκότει λάμπειν, οὐ μέντοι φῶς γε ποιεῖ, τοῦ

437 b δ' ὀφθαλμοῦ τὸ καλούμενον μέλαν καὶ μέσον λεῖον
 φαίνεται. φαίνεται δὲ τοῦτο κινουμένου τοῦ ὁμ-
 ματος διὰ τὸ συμβαίνειν ὥσπερ δύο γίνεσθαι τὸ
 ἓν. τοῦτο δ' ἡ ταχυτῆς ποιεῖ τῆς κινήσεως, ὥστε
 δοκεῖν ἕτερον εἶναι τὸ ὀρών καὶ τὸ ὀρώμενον. διὸ
 5 καὶ οὐ γίνεται, ἂν μὴ ταχέως καὶ ἐν σκότει τοῦτο
 συμβῇ· τὸ γὰρ λεῖον ἐν τῷ σκότει πέφυκε λάμπειν,
 οἷον κεφαλὰι ἰχθύων τινῶν καὶ ὁ τῆς σηπίας θολός·
 καὶ βραδέως μεταβάλλοντος τοῦ ὁμματος οὐ συμ-
 βαίνει ὥστε δοκεῖν ἅμα ἓν καὶ δύο εἶναι τό θ' ὀρών
 10 καὶ τὸ ὀρώμενον, ἐκείνως δ' αὐτὸς αὐτὸν ὀρᾷ ὁ
 ὀφθαλμός, ὥσπερ καὶ ἐν τῇ ἀνακλάσει, ἐπεὶ εἴ γε
 πῦρ ἦν, καθάπερ Ἑμπεδοκλῆς φησὶ καὶ ἐν τῷ
 Τιμαίῳ γέγραπται, καὶ συνέβαινε τὸ ὀρᾶν ἐξιόντος
 ὥσπερ ἐκ λαμπτήρος τοῦ φωτός, διὰ τί οὐ καὶ ἐν
 τῷ σκότει ἑώρα ἂν ἡ ὄψις; τὸ δ' ἀποσβέννυσθαι

^a i.e. seeing sparks.

^b A. appears to be thinking of what we call persistence of vision. If the movement is sufficiently rapid, for instance in a vibrating string, we shall appear to see not one string in successive positions but two strings each stationary in the two extreme positions.

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vision. When the eye is pressed or rolling, it seems to send forth fire.^a This may occur in darkness or when the eyes are closed ; in the latter case there is also darkness. But their explanation only raises another difficulty. For unless we suppose that it is possible to perceive and see an object of vision without knowing it, the eye must on this theory see itself. Why then does this not happen when the eye is at rest ? The reason for this and the solution of our difficulty, and the theory that vision is fire, must be found in the following considerations. It is always smooth surfaces that shine in the dark, though they do not create light, and the centre of the eye which men call the "black" of the eye is clearly smooth. But when the eye is moved it is seen because the occurrence is equivalent to making one thing appear two. It is the rapidity of the movement^b which produces the effect, so that the seeing sense and the object seen appear different. Consequently the phenomenon does not occur, unless it happens quickly and in the dark ; for it is in the dark that a smooth surface appears to shine, for instance the heads of certain fishes, and the dark fluid of the cuttlefish ; when the movement of the eye is slow, it is impossible that the seeing organ and the object seen should appear to be both one and two at the same moment. But in the other case (when the movement is rapid) the eye merely sees itself in the same sense as in reflection ; if the eye were actually fire, as Empedocles says, and as is stated in the *Timæus*,^c and if vision occurred when light issued from the eye as from a lantern, why should not vision be equally possible in the dark ? It is quite futile

Difficulties
of this
theory.

^a *Tim.* 45 c.

437 b

- 15 φάναι ἐν τῷ σκότει ἐξιοῦσαν, ὥσπερ ὁ Τίμαιος λέγει, κενόν ἐστι παντελῶς· τίς γὰρ ἀπόσβεσις φωτός ἐστιν; σβέννυται γὰρ ἢ ὑγρῷ ἢ ψυχρῷ τὸ θερμὸν καὶ ξηρόν, οἷον δοκεῖ τό τ' ἐν τοῖς ἀνθρακώδεσιν εἶναι πῦρ καὶ ἡ φλόξ, ὧν τῷ φωτὶ οὐδέτερον φαίνεται ὑπάρχον. εἰ δ' ἄρα ὑπάρχει μὲν
20 ἀλλὰ διὰ τὸ ἡρέμα λανθάνει ἡμᾶς, ἔδει μεθ' ἡμέραν τε καὶ ἐν τῷ ὕδατι ἀποσβέννυσθαι τὸ φῶς, καὶ ἐν τοῖς πάγοις μᾶλλον γίνεσθαι σκότον· ἡ γοῦν φλόξ καὶ τὰ πεπυρωμένα σώματα πάσχει τοῦτο· νῦν δ' οὐδὲν συμβαίνει τοιοῦτον. Ἐμπεδοκλῆς δ' ἔοικε
25 νομίζοντι ὅτε μὲν ἐξιόντος τοῦ φωτός, ὥσπερ εἴρηται πρότερον, βλέπειν· λέγει γοῦν οὕτως.

- ὥς δ' ὅτε τις πρόοδον νοέων ὠπλίσσατο λύχρον, χειμερίην διὰ νύκτα πυρὸς σέλας αἰθομένοιο, ἄψας παντοίων ἀνέμων λαμπτήρας ἀμοργούς, οἷτ' ἀνέμων μὲν πνεῦμα διασκιδνᾷσιν ἀέντων,
30 φῶς δ' ἔξω διαθρώσκον, ὅσον ταναώτερον ἦεν, λάμπεσκεν κατὰ βηλὸν ἀτειρέσιν ἀκτίνεσσιν· ὥς δὲ τότ' ἐν μήνιγξιν ἐεργμένον ὠγύγιον πῦρ
438 a λεπτήσιν ὀθόνησι λοχάζετο κύκλοπα κούρην· αἱ δ' ὕδατος μὲν βένθος ἀπέστεγον ἀμφινάοντος, πῦρ δ' ἔξω διαθρώσκον, ὅσον ταναώτερον ἦεν.

ὅτε μὲν οὖν οὕτως ὁρᾶν φησίν, ὅτε δὲ ταῖς ἀπορροαῖς ταῖς ἀπὸ τῶν ὀρωμένων. Δημόκριτος δ' ὅτι μὲν ὕδωρ εἶναι φησι, λέγει καλῶς, ὅτι δ' οἶεται τὸ ὁρᾶν εἶναι τὴν ἐμφασιν, οὐ καλῶς· τοῦτο μὲν γὰρ συμβαίνει ὅτι τὸ ὄμμα λεῖον, καὶ ἔστιν οὐκ ἐν ἐκείνῳ ἀλλ' ἐν τῷ ὀρώντι· ἀνάκλασις γὰρ τὸ πάθος. ἀλλὰ καθόλου περὶ τῶν ἐμφαινομένων καὶ

^a Tim. 45 D.

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to say, as the *Timaeus*^a does, that on its emergence from the eye it is extinguished in the dark ; for what meaning can we attach to this extinguishing of light ? The dry is extinguished by the wet, and the hot by the cold, as we see in the case of fire and flame in coals, but hot and dry are not qualities of light. If they do belong to light, but we do not notice it because they are motionless, the light would be extinguished in the daytime when it rains, and darkness would occur more commonly in frosty weather. Flame and bodies on fire show this phenomenon ; but no such thing occurs in the other case. Empedocles seems to imagine that vision takes place when light leaves the eye, as we have said before ; for instance he says :

Empedocles'
theory of
vision.

“ Just as when a man before sallying forth furnishes him with a lamp of gleaming fire in the stormy night, and fits thereto screens to protect it against all winds, which scatter the breath of the breezes as they blow ; and the light leaps out therefrom inasmuch as it spreads further, and shines over his threshold with tireless rays, thus also did he entrap with light webs the primaeval fire, even the round pupil of the eye, in a membrane ; and the webs shut out the depth of surrounding water, but the fire leaps out therefrom inasmuch as it spreads further.”

This is the account which he gives of vision at times, but at other times he speaks of emanations from objects seen. Democritus is right when he says that the eye is water, but wrong when he supposes vision to be mere reflection. The reflection visible in the eye occurs because the eye is smooth, and does not exist in the eye, but in the observer ; for the phenomenon is only reflection. But in general the

Democritus
on vision.

488 a

- 10 ἀνακλάσεως οὐδέν πω δῆλον ἦν, ὡς ἔοικεν. ἄτοπον δὲ καὶ τὸ μὴ ἐπελθεῖν αὐτῷ ἀπορῆσαι διὰ τί ὁ ὀφθαλμός ὁρᾷ μόνον, τῶν δ' ἄλλων οὐδέν ἐν οἷς ἐμφαίνεται τὰ εἰδωλα. τὸ μὲν οὖν τὴν ὄψιν εἶναι ὕδατος ἀληθὲς μὲν, οὐ μέντοι συμβαίνει τὸ ὁρᾶν
- 15 ἢ ὕδωρ ἀλλ' ἢ διαφανές· ὁ καὶ ἐπὶ τοῦ αἵματος κοινόν ἐστίν. ἀλλ' εὐφυλακτότερον καὶ εὐπιλητότερον τὸ ὕδωρ τοῦ αἵματος· διόπερ ἡ κόρη καὶ τὸ ὄμμα ὕδατός ἐστιν. τοῦτο δὲ καὶ ἐπ' αὐτῶν τῶν ἔργων δῆλον· φαίνεται γὰρ ὕδωρ τὸ ἐκρέον διαφθειρομένων, καὶ ἐν γε τοῖς πάμπαν ἐμβρύοις τῇ ψυχρότητι ὑπερ-
- 20 βάλλον καὶ τῇ λαμπρότητι. καὶ τὸ λευκὸν τοῦ ὀφθαλμοῦ ἐν τοῖς ἔχουσιν αἷμα πῖον καὶ λιπαρόν· ὅπερ διὰ τοῦτ' ἐστὶ, πρὸς τὸ διαμένειν τὸ ὑγρὸν ἄπηκτον. καὶ διὰ τοῦτο τοῦ σώματος ἀρριγότατον ὁ ὀφθαλμός ἐστίν· οὐδεὶς γάρ πω τὸ ἐντὸς τῶν βλεφάρων ἐρρίγωσεν. τῶν δ' ἀναίμων σκληρό-
- 25 δερμοὶ οἱ ὀφθαλμοὶ εἰσι, καὶ τοῦτο ποιεῖ τὴν σκέπην.

- "Ἀλογον δὲ ὅλως τὸ ἐξιόντι τινὶ τὴν ὄψιν ὁρᾶν, καὶ ἀποτείνεσθαι μέχρι τῶν ἀστρῶν, ἢ μέχρι τινὸς ἐξιούσαν συμφύεσθαι, καθάπερ λέγουσιν τινες. τούτου μὲν γὰρ βέλτιον τὸ ἐν ἀρχῇ συμφύεσθαι τοῦ ὀφθαλμοῦ. ἀλλὰ καὶ τοῦτο εὐήθες· τό τε γὰρ συμ-
- 30 φύεσθαι τί ἐστὶ φωτὶ πρὸς φῶς; ἢ πῶς οἶόν θ' ὑπάρχειν; οὐ γὰρ τῷ τυχόντι συμφύεται τὸ τυχόν. τό τ' ἐντὸς τῷ ἐκτὸς πῶς; ἢ γὰρ μῆνιγξ μεταξὺ ἐστίν. περὶ μὲν οὖν τοῦ ἄνευ φωτὸς μὴ ὁρᾶν εἴρηται ἐν ἄλλοις· ἀλλ' εἴτε φῶς εἴτ' ἀήρ ἐστὶ τὸ μεταξὺ τοῦ ὁρωμένου καὶ τοῦ ὀφθαλμοῦ, ἢ διὰ

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whole theory of things mirrored and reflected is so far not clear. But it is strange that it never occurred to him to wonder why the eye is the only thing which sees, and why none of the other things in which images appear do so. It is true that the eye consists of water, but its power of vision exists not because it is water, but because it is transparent ; an attribute which it shares with air. But water is more easily controlled and enclosed than air because it is denser. That the pupil and the eye are composed of water is obvious from the following facts ; for when they decay it is water that flows out of them, and this, especially in embryos, is exceedingly cold and clear. And the white of the eye in animals which have blood is fat and oily ; this is so in order that the moisture may remain unfrozen. For this reason the eye is the part of the body least sensitive to cold ; for no one has ever felt cold in the interior of the eye. But the eyes of the bloodless animals have a hard cuticle, and this constitutes a protection.

But in general it is unreasonable to suppose that seeing occurs by something issuing from the eye, and reaching as far as the stars, or issuing to a certain point and there coalescing with the object, as some think. It would be better to suppose that coalescence occurs in the eye to start with. But even this is foolish ; what is the meaning of light coalescing with light ? How could it occur ? For chance coalescence is impossible. And how could the inside coalesce with the outside ? For the membrane is between them. Elsewhere^a we have discussed the impossibility of vision without light ; but whether light or air is the medium between the sensible object and the eye, the motion through this medium is

Vision as
an emanation
from
the eye.

438 b

5 τούτου κίνησις ἐστὶν ἡ ποιούσα τὸ ὄραν. καὶ
 εὐλόγως τὸ ἐντὸς ἐστὶν ὕδατος· διαφανές γὰρ τὸ
 ὕδωρ. ὁράται δὲ ὥσπερ καὶ ἔξω οὐκ ἄνευ φωτός,
 οὕτω καὶ ἐντὸς· διαφανές ἄρα δεῖ εἶναι. καὶ ἀνάγκη
 ὕδωρ εἶναι, ἐπειδὴ οὐκ ἀήρ. οὐ γὰρ ἐπὶ τοῦ
 ἐσχάτου ὄμματος ἡ ψυχὴ ἢ τῆς ψυχῆς τὸ αἰσθητή-
 10 ριόν ἐστὶν, ἀλλὰ δῆλον ὅτι ἐντὸς· διόπερ ἀνάγκη
 διαφανές εἶναι καὶ δεκτικὸν φωτός τὸ ἐντὸς τοῦ
 ὄμματος. καὶ τοῦτο καὶ ἐπὶ τῶν συμβαινόντων
 δῆλον· ἥδη γάρ τισι πληγεῖσιν ἐν πολέμῳ παρὰ τὸν
 κρόταφον οὕτως ὥστ' ἐκτμηθῆναι τοὺς πόρους τοῦ
 ὄμματος, ἔδοξε γενέσθαι σκότος ὥσπερ λύχνου
 15 ἀποσβεσθέντος, διὰ τὸ οἶον λαμπτήρᾳ τινα ἀπο-
 τμηθῆναι τὸ διαφανές, τὴν καλουμένην κόρην.

"Ὡστ' εἴπερ τούτων τι συμβαίνει, καθάπερ λέγο-
 μεν, φανερόν ὥς δεῖ τοῦτον τὸν τρόπον ἀποδιδό-
 ναι καὶ προσάπτειν ἕκαστον τῶν αἰσθητηρίων ἐνὶ
 τῶν στοιχείων. τοῦ μὲν ὄμματος τὸ ὁρατικόν

20 ὕδατος ὑποληπτέον, ἀέρος δὲ τὸ τῶν ψόφων αἰσ-
 θητικόν, πυρὸς δὲ τὴν ὁσφρησιν. ὁ γὰρ ἐνεργεία ἡ
 ὁσφρησις, τοῦτο δυνάμει τὸ ὁσφραντικόν· τὸ γὰρ
 αἰσθητὸν ἐνεργεῖν ποιεῖ τὴν αἴσθησιν, ὥσθ' ὑπάρχειν
 ἀνάγκη αὐτὴν δυνάμει πρότερον. ἡ δ' ὁσμὴ καπ-

25 νώδης τίς ἐστὶν ἀναθυμίασις, ἡ δ' ἀναθυμίασις ἡ
 καπνώδης ἐκ πυρός. διὸ καὶ τῷ περὶ τὸν ἐγκέ-
 φalon τόπῳ τὸ τῆς ὁσφρήσεως αἰσθητήριόν ἐστιν
 ἴδιον· δυνάμει γὰρ θερμὴ ἡ τοῦ ψυχροῦ ὕλη ἐστὶν.
 καὶ ἡ τοῦ ὄμματος γένεσις τὸν αὐτὸν ἔχει τρόπον·
 ἀπὸ τοῦ ἐγκεφάλου γὰρ συνέστηκεν· οὗτος γὰρ

30 ὑγρότατος καὶ ψυχρότατος τῶν ἐν τῷ σώματι

439 a μορίων ἐστίν. τὸ δ' ἄπτικόν γῆς. τὸ δὲ γευστικόν
 εἰδός τι ἀφῆς ἐστίν. καὶ διὰ τοῦτο πρὸς τῇ καρδίᾳ

ON SENSE AND SENSIBLE OBJECTS, II.

what produces vision. And it is natural that what is within should consist of water ; for water is transparent. And just as there is no vision outside without light, so also within, there must be a transparency. And this can only be water because it is not air. For the soul or the sense organ of the soul does not reside in the surface of the eye, but must evidently be within ; consequently the part within the eye must be transparent and receptive of light. This is clear from what actually occurs ; for it is a fact that when in war men have been struck on the temple so as to sever the passages connected with the eye, darkness has fallen on them like the extinguishing of a lamp, because the transparency, called the pupil, has been cut off, as by a lamp screen.

If the facts are as we have described, it is evident that the following is the only method by which we can allot and adapt each of the sense organs to one of the elements. One would have to suppose the seeing part of the eye to be water, that which is perceptive of sound to be air, and smell to be fire. That which is smelling actually is the faculty of smelling potentially ; for the object perceived causes the sense to operate, so that this sense must have existed potentially before. For smell is a kind of smoky vapour, and a smoky vapour arises from fire. Consequently the sense organ of smell is peculiar to the region about the brain ; for matter which is cold is potentially hot. And the genesis of the eye arises in the same way, for it is developed from the brain ; for this is the most moist and coldest of all parts of the body. The faculty of touch then consists of earth ; and taste is a form of touch. For this reason

Senses
and the
elements.

439 a

τὸ αἰσθητήριον αὐτῶν, τῆς τε γεύσεως καὶ τῆς ἀφῆς· ἀντίκειται γὰρ τῷ ἐγκεφάλῳ αὐτῇ, καὶ ἔστι θερμότατον τῶν μορίων. καὶ περὶ μὲν τῶν αἰσθη-
 5 τικῶν τοῦ σώματος μορίων ἔστω τοῦτον τὸν τρόπον διωρισμένα.

III. Περὶ δὲ τῶν αἰσθητῶν τῶν καθ' ἕκαστον αἰσθητήριον, οἷον λέγω χρώματος καὶ ψόφου καὶ ὀσμῆς καὶ χυμοῦ καὶ ἀφῆς, καθόλου μὲν εἴρηται ἐν τοῖς περὶ ψυχῆς, τί τὸ ἔργον αὐτῶν καὶ τί τὸ
 10 ἐνεργεῖν καθ' ἕκαστον τῶν αἰσθητηρίων· τί δέ ποτε δεῖ λέγειν ὅτιοῦν αὐτῶν, οἷον τί χρῶμα ἢ τί ψόφον ἢ τί ὀσμὴν ἢ χυμόν, ὁμοίως δὲ καὶ περὶ ἀφῆς, ἐπισκεπτέον, καὶ πρῶτον περὶ χρώματος.

Ἔστι μὲν οὖν ἕκαστον διχῶς λεγόμενον, τὸ μὲν ἐνεργεῖα τὸ δὲ δυνάμει. τὸ μὲν οὖν ἐνεργεῖα
 15 χρῶμα καὶ ὁ ψόφος πῶς ἐστὶ τὸ αὐτὸ ἢ ἕτερον ταῖς κατ' ἐνέργειαν αἰσθήσεσιν, οἷον ὁράσει καὶ ἀκούσει, εἴρηται ἐν τοῖς περὶ ψυχῆς· τί δὲ ἕκαστον αὐτῶν ὃν ποιήσει τὴν αἰσθησιν καὶ τὴν ἐνέργειαν, νῦν λέγωμεν. ὥσπερ οὖν εἴρηται περὶ φωτὸς ἐν ἐκείνοις, ὅτι ἐστὶ χρῶμα τοῦ διαφανοῦς κατὰ συμ-
 20 βεβηκός· ὅταν γὰρ ἐνῇ τι πυρῶδες ἐν διαφανεῖ, ἢ μὲν παρουσία φῶς, ἢ δὲ στέρησις ἐστὶ σκότος. ὁ δὲ λέγομεν διαφανές, οὐκ ἔστιν ἴδιον ἀέρος ἢ ὕδατος οὐδ' ἄλλου τῶν οὕτω λεγομένων σωμάτων, ἀλλὰ τίς ἐστὶ κοινὴ φύσις καὶ δύναμις, ἢ χωριστὴ μὲν οὐκ ἔστιν, ἐν τούτοις δ' ἐστί, καὶ τοῖς ἄλλοις
 25 σώμασιν ἐνυπάρχει, τοῖς μὲν μᾶλλον τοῖς δ' ἥττον. ὥσπερ οὖν καὶ τῶν σωμάτων ἀνάγκη τι εἶναι ἔσχατον, καὶ ταύτης. ἢ μὲν οὖν τοῦ φωτὸς φύσις ἐν ἀορίστῳ τῷ διαφανεῖ ἐστίν· τοῦ δ' ἐν τοῖς

ON SENSE AND SENSIBLE OBJECTS, II.—III.

the sense organ both of taste and of touch is near the heart. For the heart is the antithesis of the brain, and is the hottest of all parts of the body. This then completes our account of the parts of the body which have perceptive faculties.

III. The sense organs concerned with each of the sensible objects, I mean with colour, sound, smell, flavour and touch, have been treated generally in the treatise *On the Soul*, where the function of each is explained, and what the activity of each sense organ is in itself; but we have now to consider how we are to describe the essence of each, to answer the question what is sound, or colour, or smell, or flavour, and similarly with regard to touch. Let us deal with colour first. Colour.

Each of these terms is used in two senses, one actually and one potentially. We have explained in the treatise *On the Soul* the sense in which actual colour and sound are identical with or different from the actual sensations, that is, seeing or hearing.^a Now let us consider what there is in each of them which will produce the sensation actually realized. In that treatise we have already said of light, that it is the colour of the transparent accidentally; for whenever there is a fiery quality in the transparence, its presence is light and its absence darkness. What we call transparence is not a quality peculiar to air or water or any other so-called body, but is a common nature and faculty, which is not separable but resides in these bodies and in others, in some to a greater and some to a less extent. Now just as every body must have some limit, so must this. Again it is the nature of light to exist in a limitless transparency;

^a *De An.* 425 b 26.

439 a

σώμασι διαφανοῦς τὸ ἔσχατον, ὅτι μὲν εἴη ἂν τι,
 δῆλον, ὅτι δὲ τοῦτ' ἐστὶ τὸ χρῶμα, ἐκ τῶν συμ-
 30 βαινόντων φανερόν. τὸ γὰρ χρῶμα ἢ ἐν τῷ πέρατι
 ἐστὶν ἢ πέρας· διὸ καὶ οἱ Πυθαγόρειοι τὴν ἐπι-
 φάνειαν χροιάν ἐκάλουν. ἔστι μὲν γὰρ ἐν τῷ τοῦ
 σώματος πέρατι, ἀλλ' οὔ τι τὸ τοῦ σώματος πέρας,
 ἀλλὰ τὴν αὐτὴν φύσιν δεῖ νομίζειν, ἥπερ καὶ ἔξω
 439 b χρωματίζεται, ταύτην καὶ ἐντός. φαίνεται δὲ καὶ
 ἁῖρ καὶ ὕδωρ χρωματιζόμενα· καὶ γὰρ ἡ αὐγὴ
 τοιοῦτόν ἐστιν. ἀλλ' ἐκεῖ μὲν διὰ τὸ ἐν ἀορίστῳ
 οὐ τὴν αὐτὴν ἐγγύθεν καὶ προσιοῦσι καὶ πόρρωθεν
 5 ἔχει χροιάν οὐθ' ὁ ἁῖρ οὐθ' ἡ θάλαττα· ἐν δὲ τοῖς
 σώμασιν ἐὰν μὴ τὸ περιέχον ποιῇ τὸ μεταβάλλειν,
 ὠρισταὶ καὶ ἡ φαντασία τῆς χροᾶς. δῆλον ἄρα
 ὅτι τὸ αὐτὸ καὶ ἐκεῖ καὶ ἐνθάδε δεκτικὸν τῆς χροᾶς
 ἐστίν. τὸ ἄρα διαφανὲς καθ' ὅσον ὑπάρχει ἐν τοῖς
 σώμασιν (ὑπάρχει δὲ μᾶλλον καὶ ἥττον ἐν πᾶσι)
 10 χρώματος ποιεῖ μετέχειν. ἐπεὶ δ' ἐν πέρατι ἡ
 χροᾶ, τούτου ἂν ἐν πέρατι εἴη. ὥστε χρῶμα ἂν
 εἴη τὸ τοῦ διαφανοῦς ἐν σώματι ὠρισμένῳ πέρας.
 καὶ αὐτῶν δὲ τῶν διαφανῶν, οἷον ὕδατος καὶ εἴ
 τι ἄλλο τοιοῦτον, καὶ ὅσοις φαίνεται χρῶμα ἴδιον
 ὑπάρχειν κατὰ τὸ ἔσχατον, ὁμοίως πᾶσιν ὑπάρχει.
 15 ἔστι μὲν οὖν ἐνεῖναι ἐν τῷ διαφανεῖ τοῦθ' ὅπερ
 καὶ ἐν τῷ αἔρι ποιεῖ φῶς, ἔστι δὲ μὴ, ἀλλ'
 ἐστερηθῆναι.

Ὡςπερ οὖν ἐκεῖ τὸ μὲν φῶς τὸ δὲ σκότος, οὕτως
 ἐν τοῖς σώμασιν ἐγγίνεται τὸ λευκὸν καὶ τὸ μέλαν.

ON SENSE AND SENSIBLE OBJECTS, III.

but it is obvious that there must be some limit to the transparency in bodies, and it is plain from the facts that this limit is actually colour; for colour either has its existence in the limit or else is the limit itself. This is why the Pythagoreans call the visible surface of a body its colour. Colour lies at the limit of the body, but is not its limit; but it is fair to suggest that the same nature which causes its colour outside, also exists within. Air and water are evidently coloured; for their brightness is of the nature of colour. But in their case because the colour exists in something which has no limit, air and sea have not the same colour near by and to those who approach them as they have at a distance. But in bodies, unless the surrounding envelope causes a change, even the appearance of the colour is defined. It is obvious then that the same thing must be receptive of the colour, both in the one case and in the other. It is then the transparency in the proportion as it exists in bodies, which causes them to share in colour (and this transparency exists in them all to a greater or less extent). But since colour exists in the limit, it must lie in the limit of transparency. So that colour would prove to be the limit of transparency in a limited body. And in the same way colour is a property both of all transparent objects, such as water and anything of a similar nature, and also of those things in which a special colour seems to exist at the limit. And whatever it is which causes light in air, sometimes seems to exist in the transparency, and at other times seems not to exist, but to have been removed.

Just then as in air we have light and darkness, so in bodies we have white and black. But we must

The formation of colours

439 b

- περὶ δὲ τῶν ἄλλων χρωμάτων ἤδη διελομένους
 20 ποσαχῶς ἐνδέχεται γίνεσθαι λεκτέον. ἐνδέχεται
 μὲν γὰρ παρ' ἄλληλα τιθέμενα τὸ λευκὸν καὶ τὸ
 μέλαν, ὥσθ' ἐκάτερον μὲν εἶναι ἀόρατον διὰ
 σμικρότητα, τὸ δ' ἐξ ἀμφοῖν ὁρατὸν οὕτω γίνεσθαι.
 τοῦτο γὰρ οὔτε λευκὸν οἶόν τε φαίνεσθαι οὔτε
 μέλαν· ἐπεὶ δ' ἀνάγκη μὲν τι ἔχειν χρῶμα, τούτων
 25 δ' οὐδέτερον δυνατόν, ἀνάγκη μικτόν τι εἶναι καὶ
 εἶδός τι χροᾶς ἕτερον. ἔστι μὲν οὖν οὕτως ὑπο-
 λαβεῖν πλείους εἶναι χροᾶς παρὰ τὸ λευκὸν καὶ τὸ
 μέλαν, πολλὰς δὲ τῷ λόγῳ· τρία γὰρ πρὸς δύο,
 καὶ τρία πρὸς τέτταρα, καὶ κατ' ἄλλους ἀριθμοὺς
 ἔστι παρ' ἄλληλα κεῖσθαι, τὰ δ' ὅλως κατὰ μὲν
 30 λόγον μηδένα, καθ' ὑπεροχὴν δέ τινα καὶ ἑλλειψιν
 ἀσύμμετρον, καὶ τὸν αὐτὸν δὴ τρόπον ἔχειν ταῦτα
 ταῖς συμφωνίαις· τὰ μὲν γὰρ ἐν ἀριθμοῖς εὐλογί-
 στοις χρώματα, καθάπερ ἐκεῖ τὰς συμφωνίας, τὰ
 440 a ἥδιστα τῶν χρωμάτων εἶναι δοκοῦντα, οἷον τὸ
 ἀλουργόν καὶ φοινικοῦν καὶ ὀλίγ' ἄττα τοιαῦτα,
 δι' ἣνπερ αἰτίαν καὶ αἱ συμφωνίαι ὀλίγαι, τὰ δὲ
 μὴ ἐν ἀριθμοῖς τᾶλλα χρώματα, ἣ καὶ πάσας τὰς
 χροᾶς ἐν ἀριθμοῖς εἶναι, τὰς μὲν τεταγμένας τὰς
 5 δὲ ἀτάκτους, καὶ αὐτὰς ταύτας, ὅταν μὴ καθαραὶ
 ᾧσι, διὰ τὸ μὴ ἐν ἀριθμοῖς εἶναι τοιαύτας γίνεσθαι.

Εἰς μὲν οὖν τρόπος τῆς γενέσεως τῶν χρωμάτων
 οὗτος, εἰς δὲ τὸ φαίνεσθαι δι' ἁλλήλων, οἷον ἐνίοτε
 οἱ γραφῆς ποιοῦσιν, ἑτέραν χροᾶν ἐφ' ἑτέραν
 ἐναργεστέραν ἐπαλείφουσιν, ὥσπερ ὅταν ἐν ὕδατι
 10 τι ἢ ἐν ἀέρι βούλωνται ποιῆσαι φαινόμενον, καὶ

ON SENSE AND SENSIBLE OBJECTS, III.

now speak of colours other than white and black, and explain in how many ways it is possible for them to occur. One possibility is that white and black are put side by side in such a way that each separate colour is invisible because of its smallness, and that what is seen is a compound of the two. This clearly cannot appear as either white or black; but since it must have some colour, and cannot have either of these, it must evidently be some kind of mixture and some other form of colour. It is thus possible to believe that there are more colours than just white and black, and that their number is due to the proportion of their components; for they may lie side by side in the ratio of three to two, or three to four, and in other proportions also, and speaking quite generally they may be in no finite numerical relation at all, but may be in asymmetrical excess or defect, and these may act in the same way as when in harmonious proportions. Now colours that depend on calculable numbers, as there are harmonies there, seem to be the most attractive colours, such as purple and red and a few others of a similar kind, but only a few, because there are few simple ratios, and possibly all the other colours are not in numerical ratios; or again it is possible that all colours are in ratios, but that some are symmetrically arranged and others not, and that these last, whenever they are not simple colours, owe their character to the absence of symmetrical arrangement.

other than
white and
black.

Colours due
to strips of
white and
black in
different
proportions.

This is one way in which colours arise, but there is another; namely when they appear through each other, as sometimes painters produce them, when they smear one colour over another more vivid one, when they want to make a thing appear to be in

Colour due
to super-
position.

440 a

οἶον ὁ ἥλιος καθ' αὐτὸν μὲν λευκὸς φαίνεται, διὰ δ' ἀχλύος καὶ καπνοῦ φοινικοῦς. πολλαὶ δὲ καὶ οὕτως ἔσονται χροαὶ τὸν αὐτὸν τρόπον τῷ πρότερον εἰρημένῳ· λόγος γὰρ ἂν εἴη τις τῶν ἐπιπολῆς πρὸς
 15 τὰ ἐν βάθει, τὰ δὲ καὶ ὅλως οὐκ ἐν λόγῳ.

Τὸ μὲν οὖν, ὥσπερ καὶ οἱ ἀρχαῖοι, λέγειν ἀπορροίας εἶναι τὰς χροίας καὶ ὁρᾶσθαι διὰ τοιαύτην αἰτίαν ἄτοπον· πάντως γὰρ δι' ἀφῆς ἀναγκαῖον αὐτοῖς ποιεῖν τὴν αἴσθησιν, ὥστ' εὐθὺς κρεῖττον φάναι τῷ κινεῖσθαι τὸ μεταξὺ τῆς αἰσθήσεως ὑπὸ
 20 τοῦ αἰσθητοῦ γίνεσθαι τὴν αἴσθησιν, ἀφῆ καὶ μὴ ταῖς ἀπορροαίαις. ἐπὶ μὲν οὖν τῶν παρ' ἄλληλα κειμένων ἀνάγκη ὥσπερ καὶ μέγεθος λαμβάνειν ἀόρατον, οὕτω καὶ χρόνον ἀναίσθητον, ἵνα λάθωσιν αἱ κινήσεις ἀφικνούμεναι καὶ ἐν δοκῇ εἶναι διὰ τὸ ἅμα φαίνεσθαι. ἐνταῦθα δὲ οὐδεμία ἀνάγκη, ἀλλὰ
 25 τὸ ἐπιπολῆς χρῶμα ἀκίνητον ὄν καὶ κινούμενον ὑπὸ τοῦ ὑποκειμένου οὐχ ὁμοίαν ποιήσει τὴν κίνησιν. διὸ καὶ ἕτερον φαίνεται καὶ οὔτε λευκὸν οὔτε μέλαν. ὥστ' εἰ μὴ ἐνδέχεται μηδὲν εἶναι μέγεθος ἀόρατον, ἀλλὰ πᾶν ἔκ τινος ἀποστήματος ὁρατόν, καὶ αὕτη τις ἂν εἴη χρωμάτων μίξις. κακείνως δ' οὐδὲν κωλύει φαίνεσθαι τινα χροαν
 30 κοινὴν τοῖς πόρρωθεν· ὅτι γὰρ οὐκ ἔστιν οὐδὲν μέγεθος ἀόρατον, ἐν τοῖς ὑστερον ἐπισκεπτέον.

440 b

Εἰ δ' ἐστὶ μίξις τῶν σωμάτων μὴ μόνον τὸν τρόπον τοῦτον ὅνπερ οἶονταί τινες, παρ' ἄλληλα τῶν ἐλαχίστων τιθεμένων, ἀδήλων δ' ἡμῖν διὰ τὴν

ON SENSE AND SENSIBLE OBJECTS, III.

water or in air ; just as the sun appears white when seen directly, but red when viewed through mist and smoke. And in this way there will be many colours in the same way as we have described. For there will be some definite relation between the superimposed colours and those below, and others again will not be in finite ratio.

But to say, as the old philosophers did, that colours are emanations from objects and are visible on this account is unreasonable ; for in that case they would all have to produce sensation by means of touch, so that it would be better to say at once that sensation is caused because the sensible object sets in motion the medium of the sensation, that is by touch and not by emanations. But on the supposition that they lie side by side, just as their size is invisible, so also the time must be imperceptible, for the arrival of the movement at the eye to escape notice and to appear one, because they are seen simultaneously. In the other case it is not necessary, but the colour of the upper layer will not produce the same movement when unmoved and when moved by the layer beneath. For this reason it appears different, and neither white nor black. So that if it is impossible for any magnitude to be unseen, but if on the other hand every magnitude is visible from some distance, then this would be some blending of colour. In that case there is nothing to prevent any colour from appearing to come from a distance ; later on we must examine the statement that no magnitude can be invisible.

Colours as emanations from objects.

But if a mingling of bodies occurs, it is not merely in the way in which some people think, when very small coloured objects are placed side by side, which

Mixture.

αἰσθησιν, ἀλλ' ὅλως πάντῃ πάντως, ὥσπερ ἐν τοῖς
περὶ μίξεως εἴρηται καθόλου περὶ πάντων. ἐκείνως
5 μὲν γὰρ μίγνυται ταῦτα μόνον ὅσα ἐνδέχεται
διελεῖν εἰς τὰ ἐλάχιστα, καθάπερ ἀνθρώπους ἵππους
ἢ τὰ σπέρματα· τῶν μὲν γὰρ ἀνθρώπων ἄνθρωπος
ἐλάχιστος, τῶν δ' ἵππων ἵππος· ὥστε τῇ τούτων
παρ' ἄλληλα θέσει τὸ πλῆθος μέμικται τῶν συν-
αμφοτέρων· ἄνθρωπον δὲ ἓνα ἐνὶ ἵππῳ οὐ λέγομεν
10 μεμίχθαι. ὅσα δὲ μὴ διαιρεῖται εἰς τὸ ἐλάχιστον,
τούτων οὐκ ἐνδέχεται μίξιν γενέσθαι τὸν τρόπον
τοῦτον ἀλλὰ τῷ πάντῃ μεμίχθαι, ἅπερ καὶ μάλιστα
μίγνυσθαι πέφυκεν. πῶς δὲ τοῦτο γίνεσθαι
δυνατόν, ἐν τοῖς περὶ μίξεως εἴρηται πρότερον.
ἀλλ' ὅτι ἀνάγκη μιγνυμένων καὶ τὰς χροὰς μίγνυ-
15 σθαι, δῆλον, καὶ ταύτην τὴν αἰτίαν εἶναι κυρίαν τοῦ
πολλὰς εἶναι χροίας, ἀλλὰ μὴ τὴν ἐπιπόλασιν μηδὲ
τὴν παρ' ἄλληλα θέσιν· οὐ γὰρ πόρρωθεν μὲν
ἐγγύθεν δ' οὐ φαίνεται μία χροὰ τῶν μεμιγμένων,
ἀλλὰ πάντοθεν. πολλὰ δ' ἔσονται χροαὶ διὰ τὸ
κατὰ πολλοὺς λόγους ἐνδέχεσθαι μίγνυσθαι ἀλ-
20 λήλοις τὰ μιγνύμενα, καὶ τὰ μὲν ἐν ἀριθμοῖς τὰ
δὲ καθ' ὑπεροχὴν μόνον. καὶ τὰλλα δὴ τὸν αὐτὸν
τρόπον ὅνπερ ἐπὶ τῶν παρ' ἄλληλα τιθεμένων
χρωμάτων ἢ ἐπιπολῆς, ἐνδέχεται λέγειν καὶ περὶ
τῶν μιγνυμένων· διὰ τίνα δ' αἰτίαν εἶδη τῶν
χρωμάτων ἐστὶν ὠρισμένα καὶ οὐκ ἄπειρα, καὶ
25 χυμῶν καὶ ψόφων, ὥστερον ἑροῦμεν.

IV. Τί μὲν οὖν ἐστὶ χρῶμα καὶ διὰ τίν' αἰτίαν
πολλὰι χροαὶ εἰσιν, εἴρηται· περὶ δὲ ψόφου καὶ
φωνῆς εἴρηται πρότερον ἐν τοῖς περὶ ψυχῆς· περὶ
230

ON SENSE AND SENSIBLE OBJECTS, III.—IV.

are not obvious to the sense, but generally everywhere and in every way, as has been said in our discussion of mixtures in general.^a In that case mixture is only possible in the case of those things which can be divided into the infinitely small, such as men, horses or seeds ; for man is the smallest unit of men, and a horse of horses ; so that by the placing of these side by side, the whole number becomes a mixture of both ; but we cannot speak of one man being mixed with one horse. But with things which are not divided into their smallest units there can be no mixture in this sense, but only a complete mingling, which is the most natural sense of mixture. How this can occur has been discussed previously in our discussion of mixture.^a But it is clear that colours must be mixed when the substances in which they occur are mixed, and that is the real reason why there are many colours ; it is not due either to overlaying or to placing side by side ; for it is not that from a distance and not from near by there appears to be one colour from the mixture, but from all distances. But there will be many colours, because it is possible for the mixed element to be combined in various ratios, some being numerical and some merely an excess of one over another. In the case of mixtures all that can be said of colours put side by side or overlaid applies ; but why the possible forms of colour are limited and not unlimited, which is also true of flavours and sounds, we will discuss later on.

IV. We have now explained what colour is, and why there are many colours. We have previously discussed sound and voice in our treatise *On the*

Smell and
flavour.

^a So far as is known this does not refer to any special treatise.

440 b

δὲ ὁσμῆς καὶ χυμοῦ νῦν λεκτέον. σχεδὸν γάρ
 30 ἔστι τὸ αὐτὸ πάθος, οὐκ ἐν τοῖς αὐτοῖς δ' ἔστιν
 ἑκάτερον αὐτῶν. ἐναργέστερον δ' ἔστιν ἡμῖν τὸ
 τῶν χυμῶν γένος ἢ τὸ τῆς ὁσμῆς. τούτου δ'
 441 a αἷτιον ὅτι χειρίστην ἔχομεν τῶν ἄλλων ζώων τὴν
 ὁσφρησιν καὶ τῶν ἐν ἡμῖν αὐτοῖς αἰσθήσεων, τὴν
 δ' ἀφὴν ἀκριβεστάτην τῶν ἄλλων ζώων. ἡ δὲ
 γεῦσις ἀφή τις ἐστίν.

Ἡ μὲν οὖν τοῦ ὕδατος φύσις βούλεται ἄχυμος
 5 εἶναι· ἀνάγκη δ' ἢ ἐν αὐτῷ τὸ ὕδωρ ἔχειν τὰ
 γένη τῶν χυμῶν ἀναίσθητα διὰ μικρότητα, καθάπερ
 Ἐμπεδοκλῆς φησίν, ἢ ὕλην τοιαύτην ἐνεῖναι οἶον
 πανσπερμίαν χυμῶν, καὶ ἅπαντα μὲν ἐξ ὕδατος
 γίνεσθαι, ἄλλα δ' ἐξ ἄλλου μέρους, ἢ μηδεμίαν
 ἔχοντος διαφορὰν τοῦ ὕδατος τὸ ποιοῦν αἷτιον
 10 εἶναι, οἶον εἰ τὸ θερμὸν καὶ τὸν ἥλιον φαίη τις.
 τούτων δ', ὥς μὲν Ἐμπεδοκλῆς λέγει, λίαν εὐ-
 σύνοπτον τὸ ψεῦδος· ὁρῶμεν γὰρ μεταβάλλοντας
 ὑπὸ τοῦ θερμοῦ τοὺς χυμοὺς ἀφαιρουμένων τῶν
 περικαρπίων εἰς τὸν ἥλιον καὶ πυρουμένων, ὥς
 οὐ τῷ ἐκ τοῦ ὕδατος ἔλκειν τοιούτους γινομένους,
 ἀλλ' ἐν αὐτῷ τῷ περικαρπίῳ μεταβάλλοντας, καὶ
 15 ἐξικμαζομένους δὲ καὶ κειμένους, διὰ τὸν χρόνον,
 αὐστηροὺς ἐκ γλυκέων καὶ πικρὺς καὶ παντο-
 दाποὺς γινομένους, καὶ ἐψομένους, εἰς πάντα τὰ
 γένη τῶν χυμῶν ὥς εἰπεῖν μεταβάλλοντας. ὁμοίως
 δὲ καὶ τὸ πανσπερμίας εἶναι τὸ ὕδωρ ὕλην ἀδύνα-
 20 τον· ἐκ τοῦ αὐτοῦ γὰρ ὁρῶμεν ὥς¹ τροφῆς γινο-

¹ ἐκ τῆς αὐτῆς ins. B.

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Soul.^a We have now to consider smell and flavour. These two are almost the same affection, though they do not occur in the same circumstances. The class of flavours is more easily defined than that of smells. The reason for this is that our sense of smell is inferior to that of all other living creatures, and also inferior to all the other senses we possess, but our sense of touch is more accurate than that of any other living creature. Taste is a form of touch.

Now it is the nature of water to be tasteless ; Theories of taste. there are therefore three possibilities : (1) Water may possess within itself all kinds of flavours, which are imperceptible because of their small quantity, as Empedocles suggests. (2) Water may contain matter of such a kind as to be the seed of all flavours, that is to say that all flavours arise from water, some from one part and some from another. (3) Without water having any effect on it at all, that which acts on it may be the cause, as for instance one might suggest heat or the sun as the cause. Now of these (1) Empedocles. three theories, the first—that of Empedocles—is palpably false ; for we find flavours changing under the influence of heat, when seed pods are detached from the trees and scorched in the sun, so that flavours have not become what they are by extraction from water, but have changed in the seed pod itself, and by evaporation and lying still, in time, have changed from sweet to harsh, and bitter and all other kinds, and by being baked have changed, so to speak, into all kinds of flavours. In the same way, that water (2) Water is not the origin of all flavours. should be the material of all the origin of flavours is impossible ; for one notices different kinds of flavours arising from the same water, considered as food. The

^a *De An.* 419 b, 420 a.

441 a

μένους ἐτέρους χυμούς. λείπεται δὴ τῷ πάσχειν τι τὸ ὕδωρ μεταβάλλειν. ὅτι μὲν τοῖνυν οὐχ ὑπὸ τῆς τοῦ θερμοῦ δυνάμεως λαμβάνει ταύτην τὴν δύναμιν ἣν καλοῦμεν χυμόν, φανερόν· λεπτότατον γὰρ τῶν πάντων ὑγρῶν τὸ ὕδωρ ἐστί, καὶ αὐτοῦ τοῦ ἐλαίου. ἀλλ' ἐπεκτείνεται ἐπὶ πλεῖον τοῦ

25 ὕδατος τὸ ἔλαιον διὰ τὴν γλισχρότητα. τὸ δ' ὕδωρ ψαθυρόν ἐστι· διὸ καὶ χαλεπώτερον φυλάξαι ἐν τῇ χειρὶ ὕδωρ ἢ ἔλαιον. ἐπεὶ δὲ θερμαινόμενον οὐδὲν φαίνεται παχυνόμενον τὸ ὕδωρ αὐτὸ μόνον, δηλὸν ὅτι ἑτέρα τις ἂν εἴη αἰτία· οἱ γὰρ χυμοὶ πάντες πάχος ἔχουσι μᾶλλον· τὸ δὲ θερμόν συν-
30 αἰτίον. φαίνονται δ' οἱ χυμοὶ ὅσοι περ καὶ ἐν τοῖς

441 b

περικαρπίοις, οὗτοι ὑπάρχοντες καὶ ἐν τῇ γῇ. διὸ καὶ πολλοὶ φασὶ τῶν ἀρχαίων φυσιολόγων τοιοῦτον εἶναι τὸ ὕδωρ δι' οἷας ἂν γῆς πορεύηται. καὶ τοῦτο δηλὸν ἐστὶν ἐπὶ τῶν ἀλμυρῶν ὑδάτων μάλιστα· οἱ γὰρ ἅλεις γῆς τι εἶδος εἰσιν. καὶ τὰ διὰ τῆς

5 τέφρας διηθούμενα πικρᾶς οὔσης πικρὸν ποιεῖ τὸν χυμόν. εἰσὶ τε κρῆναι πολλαὶ αἱ μὲν πικραί, αἱ δ' ὀξείαι, αἱ δὲ παντοδαποὺς ἔχουσαι χυμούς ἄλλους. διὸ¹ εὐλόγως δ' ἐν τοῖς φυομένοις τὸ τῶν χυμῶν γίνεται γένος μάλιστα. πάσχειν γὰρ πέφυκε τὸ ὑγρόν, ὥσπερ καὶ τᾶλλα, ὑπὸ τοῦ ἐναντίου·

10 ἐναντίον δὲ τὸ ξηρόν. διὸ καὶ ὑπὸ τοῦ πυρὸς πάσχει τι· ξηρὰ γὰρ ἢ τοῦ πυρὸς φύσις. ἀλλ' ἴδιον τοῦ πυρὸς τὸ θερμόν ἐστι, γῆς δὲ τὸ ξηρόν, ὥσπερ εἴρηται ἐν τοῖς περὶ στοιχείων. ἥ μὲν οὖν πῦρ καὶ ἡ γῆ, οὐδὲν πέφυκε ποιεῖν ἢ πάσχειν, οὐδ' ἄλλο οὐδέν· ἡ δ' ὑπάρχει ἐναντιότης ἐν

15 ἐκάστω, ταύτῃ πάντα καὶ ποιοῦσι καὶ πάσχουσιν. ὥσπερ οὖν οἱ ἐναποπλύνοντες ἐν τῷ ὑγρῷ τὰ

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alternative solution is that the water changes by being affected in some way. Now it is clear that it does not acquire the faculty which we call taste from the power of heat; for water is the lightest of all liquids, lighter even than oil. But oil will spread over a larger surface than water because of its viscosity. But water does not cohere so closely; consequently it is more difficult to hold water in the hand than oil. But since water by itself when heated shows no sign of thickening, it is clear that there must be some other reason; for all flavours show density; and heat is a contributory cause. All the flavours which exist in seed pods also exist in the earth. Consequently some of the old philosophers stated that water draws its character from the earth through which it passes. This is obvious in the case of brackish water; for salt is a form of earth. Water which has percolated through ashes which are bitter has a bitter flavour. But of the many water fountains some are bitter, some sharp, and others have different kinds of flavours. But the class of flavours is most obvious in plants, and this is natural. For "wet," like everything else, is naturally affected by its opposite; and its opposite is "dry." This is why it is affected to some extent by fire; for the nature of fire is dry. But the special quality of fire is heat, and of earth dryness, as has been said in our discussion of the elements.^a Neither fire nor earth is likely to produce or suffer an effect *qua* fire or *qua* earth; but all effect is produced and suffered, in so far as some contrariety exists in each. So just as those who wash off colours or flavours in liquid cause the water to

(S) Water is affected in some way.

How the water is affected.

^a *De Gen. et Corr.* 329 a.

¹ $\delta\iota\delta$ om. B.

141 b

χρώματα καὶ τοὺς χυμοὺς τοιοῦτον ἔχειν ποιούσι
 τὸ ὕδωρ, οὕτω καὶ ἡ φύσις τὸ ξηρὸν καὶ τὸ
 γεώδες, καὶ διὰ τοῦ ξηροῦ καὶ γεώδους διηθοῦσα
 καὶ κινούσα τῷ θερμῷ ποιόν τι τὸ ὑγρὸν παρα-
 σκευάζει. καὶ ἔστι τοῦτο χυμὸς τὸ γιγνόμενον
 20 ὑπὸ τοῦ εἰρημένου ξηροῦ πάθος ἐν τῷ ὑγρῷ τῆς
 γεύσεως τῆς κατὰ δύναμιν ἀλλοιωτικὸν εἰς ἐνέρ-
 γειαν· ἄγει γὰρ τὸ αἰσθητικὸν εἰς τοῦτο δυνάμει
 προϋπάρχον· οὐ γὰρ κατὰ τὸ μανθάνειν ἀλλὰ κατὰ
 τὸ θεωρεῖν ἐστὶ τὸ αἰσθάνεσθαι.

“Οτι δ’ οὐ παντὸς ξηροῦ ἀλλὰ τοῦ τροφίμου οἱ
 25 χυμοὶ ἢ πάθος εἰσὶν ἢ στέρησις, δεῖ λαβεῖν ἐντεῦθεν,
 ὅτι οὔτε τὸ ξηρὸν ἄνευ τοῦ ὑγροῦ οὔτε τὸ ὑγρὸν
 ἄνευ τοῦ ξηροῦ· τροφή γὰρ οὐδὲν αὐτῶν τοῖς
 ζώοις, ἀλλὰ τὸ μεμιγμένον. καὶ ἔστι τῆς προσ-
 φερομένης τροφῆς τοῖς ζώοις τὰ μὲν ἀπτὰ τῶν
 αἰσθητῶν αὐξήσιν ποιοῦντα καὶ φθίσιν· τούτων
 30 μὲν γὰρ αἷτιον ἢ θερμὸν καὶ ψυχρὸν τὸ προσφερό-
 142 a μενον· ταῦτα γὰρ ποιεῖ καὶ αὐξήσιν καὶ φθίσιν·
 τρέφει δὲ ἢ γευστὸν τὸ προσφερόμενον· πάντα
 γὰρ τρέφεται τῷ γλυκεῖ, ἢ ἀπλῶς ἢ μεμιγμένως.
 δεῖ μὲν οὖν διορίζειν περὶ τούτων ἐν τοῖς περὶ
 γενέσεως, νῦν δ’ ὅσον ἀναγκαῖον αἰσθῆναι αὐτῶν.
 5 τὸ γὰρ θερμὸν αὐξάνει καὶ δημιουργεῖ τὴν τροφήν,
 καὶ τὸ μὲν κοῦφον ἔλκει, τὸ δ’ ἄλμυρον καὶ πικρὸν
 καταλείπει διὰ βάρους. ὃ δὴ ἐν τοῖς ἔξω σώμασι
 ποιεῖ τὸ ἔξω θερμὸν, τοῦτο ἐν τῇ φύσει τῶν ζώων
 καὶ φυτῶν· διὸ τρέφεται τῷ γλυκεῖ. συμμίσγυνται
 δ’ οἱ ἄλλοι χυμοὶ εἰς τὴν τροφήν τὸν αὐτὸν τρό-
 10 πον τῷ ἄλμυρῷ καὶ ὀξεῖ, ἀντὶ ἡδύσματος. ταῦτα

^a Cf. *De An.* 417 b 19.

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assume these colours or flavours, so also nature treats what is dry and earthy, and causing water to percolate through what is dry and earthy, and moving it by heat, causes the liquid to assume some character. And this affection produced by the dry, as explained, being washed in the moist, transforms potential taste into actual taste, which is flavour. For it brings the capacity for sensation to actuality ; for sensation is analogous not to the acquisition of knowledge, but to the exercise of it.^a

The flavours however are not the affection nor the absence of every dry thing, but only of dry food, which one can deduce from the fact that there is no dry without wet, nor wet without dry ; for neither of these is adequate as food for living creatures, but a mixture of the two. But of the food offered to animals which is perceptible, it is the tangible parts that cause growth and decay ; and the food offered is responsible for these, *qua* hot and cold ; for these things cause both growth and decay ; but the food offered nourishes because it is tasted ; for everything is nourished by the sweet, either isolated or in combination. The details of this must be discussed in the treatise *On Generation*,^b but for the moment can only be referred to as far as is essential. For heat increases and fashions the food, and extracts from it what is light, leaving behind what is harsh and bitter owing to its weight. The functions performed by external heat in external bodies is performed by their natural heat in animals and plants ; therefore they are nourished by what is sweet. But all the other flavours are mixed with food in the same way as the harsh and acid, for the purpose of seasoning. These

^b *De Gen. et Corr.* i. 5, 350-352.

442 a

δὲ διὰ τὸ ἀντισπᾶν τῷ λίαν τρόφimon εἶναι τὸ γλυκὺ καὶ ἐπιπολαστικόν.

Ὡσπερ δὲ τὰ χρώματα ἐκ λευκοῦ καὶ μέλανος μίξεώς ἐστιν, οὕτως οἱ χυμοὶ ἐκ γλυκέος καὶ πικροῦ. καὶ κατὰ λόγον δὴ τῷ μᾶλλον καὶ ἧττον
 15 ἕκαστοί εἰσιν, εἴτε κατ' ἀριθμούς τινας τῆς μίξεως καὶ κινήσεις, εἴτε καὶ ἀορίστως. οἱ δὲ τὴν ἡδοιὴν ποιοῦντες μιγνύμενοι, οὗτοι ἐν ἀριθμοῖς. μόνος μὲν οὖν λιπαρὸς ὁ τοῦ¹ γλυκέος ἐστὶ χυμός, τὸ δ' ἄλμυρόν καὶ πικρόν σχεδὸν τὸ αὐτό, ὁ δὲ αὐστηρὸς καὶ δριμύς καὶ στρυφνὸς καὶ ὄξυς ἀνὰ μέσον.

20 Σχεδὸν γὰρ ἴσα καὶ τὰ τῶν χυμῶν εἶδη καὶ τὰ τῶν χρωμάτων ἐστίν. ἐπτὰ γὰρ ἀμφοτέρων εἶδη, ἂν τις τιθῇ, ὥσπερ εὐλογον, τὸ φαιὸν μέλαν τι εἶναι. λείπεται γὰρ τὸ ξανθὸν μὲν τοῦ λευκοῦ εἶναι ὥσπερ τὸ λιπαρὸν τοῦ γλυκέος, τὸ φοινικοῦν δὲ καὶ ἄλουργόν καὶ πράσινον καὶ κυανοῦν μεταξὺ
 25 τοῦ λευκοῦ καὶ μέλανος, τὰ δ' ἄλλα μικτὰ ἐκ τούτων. καὶ ὥσπερ τὸ μέλαν στέρησις ἐν τῷ διαφανεῖ τοῦ λευκοῦ, οὕτω τὸ ἄλμυρόν καὶ πικρόν τοῦ γλυκέος ἐν τῷ τροφίμῳ ὑγρῷ. διὸ καὶ ἡ τέφρα τῶν κατακαομένων πικρὰ πάντων. ἐξί-
 30 κμασται γὰρ τὸ πότιμον ἐξ αὐτῶν.

30 Δημόκριτος δὲ καὶ οἱ πλείστοι τῶν φυσιολόγων, ὅσοι λέγουσι περὶ αἰσθήσεως, ἀποπώτατόν τι
 442 b ποιοῦσιν· πάντα γὰρ τὰ αἰσθητὰ ἀπτὰ ποιοῦσιν. καίτοι εἰ οὕτω τοῦτ' ἔχει, δῆλον ὡς καὶ τῶν ἄλλων αἰσθήσεων ἐκάστη ἀφή τις ἐστίν· τοῦτο δ' ὅτι ἀδύνατον, οὐ χαλεπὸν συνιδεῖν. ἔτι δὲ τοῖς κοινοῖς
 6 τῶν αἰσθήσεων πασῶν χρῶνται ὡς ἰδίοις· μέγεθος γὰρ καὶ σχῆμα καὶ τὸ τραχὺ καὶ τὸ λείον, ἔτι
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are required to counteract the excessive sweetness of food, which would lie undigested in the stomach.

Just then as colours are a mingling of white and black, so flavours are a mixing of sweet and bitter. And each pair, in some greater or smaller ratio, is either with definite numerical values and movements in the mixture, or without definite limits. But those which when mingled give pleasure are all in numerical ratios. Only the flavour of the sweet is rich, and the brackish is almost the same as the bitter, but the harsh, pungent, astringent and sharp are intermediate.

Flavours
and colours
are ana-
logous.

The kinds of flavour are almost the same as those of colours. For there are seven forms of each, if one regards grey, as is natural, as a variant of black. It remains to consider yellow as a variant of white, just as we regard rich as a variant of sweet, then red, scarlet, purple, green and blue are colours intermediate between white and black, and the rest are a mixture of these. And just as black is an absence of white in the transparent medium, so brackish and bitter is an absence of sweet in moist food. This is why the ash of everything burned is bitter; for the drinkable moisture has been evaporated from them.

The analogy
continued.

But Democritus and most of the physical philosophers who treat of sensation produce a most unreasonable hypothesis; for they make all sensible objects objects of touch. And yet it is obvious that, if this be so, each of the other senses is a kind of touch. Now it is not difficult to see that this is impossible. Again they treat of objects perceived, which are common to all the senses, as if they were peculiar to one; for size, shape, rough and smooth,

Some
thinkers
refer all
senses to
touch.

¹ ἀριθμοῖς μόνον. ὁ μὲν οὖν λιπαρὸς τοῦ κτλ. B.

δὲ τὸ ὀξύ καὶ τὸ ἀμβλὺ τὸ ἐν τοῖς ὄγκοις κοινὰ
 τῶν αἰσθήσεών ἐστιν, εἰ δὲ μὴ πασῶν, ἀλλ' ὅψεώς
 γε καὶ ἀφῆς. διὸ καὶ περὶ μὲν τούτων ἀπατῶνται,
 περὶ δὲ τῶν ἰδίων οὐκ ἀπατῶνται, οἷον ὅψις περὶ
 10 χρώματος καὶ ἀκοή περὶ ψόφων. οἱ δὲ τὰ ἴδια
 εἰς ταῦτα ἀνάγουσιν, ὥσπερ Δημόκριτος· τὸ γὰρ
 λευκὸν καὶ τὸ μέλαν τὸ μὲν τραχύ φησιν εἶναι τὸ
 δὲ λείον, εἰς δὲ τὰ σχήματα ἀνάγει τοὺς χυμούς.
 καίτοι ἢ οὐδεμιᾶς ἢ μᾶλλον τῆς ὁψεως τὰ κοινὰ
 γνωρίζειν. εἰ δ' ἄρα τῆς γεύσεως μᾶλλον, τὰ
 15 γούν ἐλάχιστα τῆς ἀκριβεστάτης ἐστὶν αἰσθήσεως
 διακρίνειν περὶ ἕκαστον γένος, ὥστε ἐχρῆν τὴν
 γεῦσιν καὶ τῶν ἄλλων κοινῶν αἰσθάνεσθαι μάλιστα
 καὶ τῶν σχημάτων εἶναι κριτικωτάτην. ἔτι τὰ
 μὲν αἰσθητὰ πάντα ἔχει ἐναντίωσιν, οἷον ἐν χρώ-
 ματι τῷ μέλανι τὸ λευκὸν καὶ ἐν χυμοῖς τῷ γλυκεῖ
 20 τὸ πικρόν· σχῆμα δὲ σχήματι οὐ δοκεῖ εἶναι
 ἐναντίον· τίτι γὰρ τῶν πολυγώνων τὸ¹ περιφερὲς
 ἐναντίον; ἔτι ἀπείρων ὄντων τῶν σχημάτων
 ἀναγκαῖον καὶ τοὺς χυμοὺς εἶναι ἀπείρους· διὰ τί
 γὰρ ὁ μὲν ἂν ποιήσειεν αἰσθῆσιν, ὁ δ' οὐκ ἂν
 ποιήσειεν; καὶ περὶ μὲν τοῦ γευστοῦ καὶ χυμοῦ
 25 εἴρηται· τὰ γὰρ ἄλλα πάθη τῶν χυμῶν οἰκείαν
 ἔχει τὴν σκέψιν ἐν τῇ φυσιολογίᾳ τῇ περὶ τῶν
 φυτῶν.

V. Τὸν αὐτὸν δὲ τρόπον δεῖ νοῆσαι καὶ περὶ τὰς
 ὁσμάς· ὅπερ γὰρ ποιεῖ ἐν τῷ ὑγρῷ τὸ ξηρόν,
 τοῦτο ποιεῖ ἐν ἄλλῳ γένει τὸ ἐγχυμον ὑγρόν, ἐν
 30 αἲρι καὶ ὕδατι ὁμοίως. κοινὸν δὲ κατὰ τούτων νῦν
 448 a μὲν λέγομεν τὸ διαφανές, ἔστι δ' ὁσφραντὸν οὐχ
 ἢ διαφανές, ἀλλ' ἢ πλυντικὸν ἢ ῥυπτικὸν ἐγχύμου

¹ τὸ om. B.

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besides sharp and blunt, as found in solid bodies, are common, if not to all the senses, at least to sight and touch. So the senses are liable to error in dealing with common sensibles, but they are not mistaken about the objects of special senses; for instance vision is not in error about colour, nor hearing about sound. But these thinkers attribute special objects to general senses, as Democritus does. For he says that white and black are rough and smooth respectively, and he refers flavours to shapes. And yet surely it is not the function of any one sense or rather only of sight to recognize common sensibles. If we attribute such a function to taste, seeing that it is the mark of the most discriminating sense to recognize the smallest in each class, taste ought to have been most capable of perceiving shapes. Again sensible objects show pairs of opposites, for instance black and white in colours, and bitter and sweet in flavours. But no figure appears opposite to any other; in what sense is a sphere opposite to a polygon? Again, as figures are infinite in number, flavours would necessarily be also infinite; for why should one flavour produce sensation and not another? This finishes our discussion of taste and flavour; the other affections of flavour have their proper place of inquiry in the *Natural History of Plants*.^a

V. Now we must consider smelling in the same Smell. way; for the effect which the dry produces in the wet is also produced by liquid flavour in another class, both in air and in water. In these transparency is a common property, but the object is not smelt because it is transparent, but because it is capable of washing or cleansing the moistened dryness; for

^a No such treatise by Aristotle has come down to us.

ξηρότητος· οὐ γὰρ μόνον ἐν ἀέρι ἀλλὰ καὶ ἐν ὕδατι
 τὸ τῆς ὀσφρῆσεώς ἐστιν. δῆλον δ' ἐπὶ τῶν ἰχθύων
 καὶ τῶν ὀστρακοδέρμων· φαίνονται γὰρ ὀσφραϊνό-
 5 μενα οὔτε ἀέρος ὄντος ἐν τῷ ὕδατι (ἐπιπολάζει γὰρ
 ὁ ἀήρ, ὅταν ἐγγένηται) οὔτ' αὐτὰ ἀναπνέοντα. εἰ
 οὖν τις θείῃ καὶ τὸν ἀέρα καὶ τὸ ὕδωρ ἄμφω ὑγρά,
 εἴη ἂν ἡ ἐν ὑγρῷ τοῦ ἐγχύμου ξηροῦ φύσις ὀσμή,
 καὶ ὀσφραντὸν τὸ τοιοῦτον. ὅτι δ' ἀπ' ἐγχύμου¹
 ἐστὶ τὸ πάθος, δῆλον ἐκ τῶν ἐχόντων καὶ μὴ
 10 ἐχόντων ὀσμήν· τά τε γὰρ στοιχεῖα ἄοσμα, οἷον πῦρ
 ἀήρ ὕδωρ γῆ, διὰ τὸ τά τε ξηρὰ αὐτῶν καὶ τὰ ὑγρά
 ἄχυμα εἶναι, ἐὰν μὴ τι μιγνύμενον ποιῇ. διὸ καὶ
 ἡ θάλαττα ἔχει ὀσμήν· ἔχει γὰρ χυμὸν καὶ ξηρό-
 τητα. καὶ ἄλλες μᾶλλον λίτρον ὀσμώδεις· δηλοῖ δὲ
 τὸ ἐξικμαζόμενον ἐξ αὐτῶν ἔλαιον· τὸ δὲ λίτρον γῆς
 15 ἐστὶ μᾶλλον. ἔτι λίθος μὲν ἄοσμον, ἄχυμον γάρ,
 τὰ δὲ ξύλα ὀσμώδη, ἔγχυμα γάρ· καὶ τούτων τὰ
 ὕδατώδη ἦττον. ἔτι τῶν μεταλλευομένων χρυσὸς
 ἄοσμον, ἄχυμον γάρ, ὁ δὲ χαλκὸς καὶ ὁ σίδηρος
 ὀσμώδη. ὅταν δ' ἐκκαυθῇ τὸ ὑγρόν, ἀοσμότεραι αἰ
 20 σκωρίαι γίνονται πάντων. ἄργυρος δὲ καὶ κατ-
 τίτερος τῶν μὲν μᾶλλον ὀσμώδη τῶν δ' ἦττον·
 ὕδατώδη γάρ.

Δοκεῖ δ' ἐνίοις ἡ καπνώδης ἀναθυμίασις εἶναι
 ὀσμή, οὔσα κοινὴ γῆς τε καὶ ἀέρος. καὶ πάντες
 ἐπιφέρονται ἐπὶ τοῦτο περὶ ὀσμῆς· διὸ καὶ Ἡρά-
 κλειτος οὕτως εἴρηκεν, ὥς εἰ πάντα τὰ ὄντα καπ-

¹ ἅπαν χυμοῦ B.

^a This is very doubtful, although fishes have an olfactory nerve.

ON SENSE AND SENSIBLE OBJECTS, v.

this phenomenon of smelling occurs not only in air, but also in water. This is obvious in the case of fishes and hard-shelled creatures ; for they evidently have the power of smelling,^a though there is no air in water (for whenever it is generated in water it rises to the surface), nor do such creatures inhale. If one were to assume that water and air are both moist, the characteristic of flavoured dryness in the wet would be smell, and anything of this kind would be an object smelt. That the affection we call smell is based on flavour is obvious from a consideration of those things which have, and those which have not smell. The elements are scentless, such as fire, air, water and earth, because both those which are dry and those which are wet have no flavour, unless something is mixed with them. This is the reason why the sea has a smell ; for it possesses both flavour and dryness. Salt has more smell than sodium carbonate : the oil which exudes from the former proves this ; but sodium carbonate belongs more to earth. Stone again has no smell because it has no taste, but woods have a smell because they have also taste ; and wet woods have less taste than dry. In the case of the metals gold has no smell because it has no taste, but bronze and iron have smell. But when the moisture is burned out of them, the slag of all of them has less smell. But silver and tin have more smell than gold, and less than bronze and iron ; for they contain water.

Some people think that smell is a smoky vapour, which is partly earth and partly air. Everyone in fact inclines to this view about smell : it is with this idea that Heracleitus has said that, if everything that exists became smoke, the nose would be the

The nature of smell.

443 a

25 νὸς γένοιτο, ρῖνες ἂν διαγνοῖεν. ἐπὶ δὲ τὴν ὁσμὴν πάντες ἐπιφέρονται οἱ μὲν ὡς ἀτμίδα, οἱ δ' ὡς ἀναθυμίασιν, οἱ δ' ὡς ἄμφω ταῦτα. ἔστι δ' ἡ μὲν ἀτμίς ὑγρότης τις, ἡ δὲ καπνώδης ἀναθυμίασις, ὥσπερ εἴρηται, κοινὸν αἶρος καὶ γῆς· καὶ συνίσταται ἐκ μὲν ἐκείνης ὕδαρ, ἐκ δὲ ταύτης γῆς τι εἶδος.
 30 ἀλλ' οὐδέτερον τούτων ἔοικεν· ἡ μὲν γὰρ ἀτμίς ἐστὶν ὕδατος, ἡ δὲ καπνώδης ἀναθυμίασις ἀδύνατος ἐν ὕδατι γενέσθαι. ὁσμᾶται δὲ καὶ τὰ ἐν τῷ ὕδατι,
 443 b ὥσπερ εἴρηται πρότερον. ἔτι ἡ ἀναθυμίασις ὁμοίως λέγεται ταῖς ἀπορροαῖς. εἰ οὖν μηδ' ἐκείνη καλῶς, οὐδ' αὕτη καλῶς.

“Οτι μὲν οὖν ἐνδέχεται ἀπολαύειν τὸ ὑγρὸν καὶ τὸ ἐν τῷ πνεύματι καὶ τὸ ἐν τῷ ὕδατι καὶ πᾶσχειν τι
 5 ὑπὸ τῆς ἐγχύμου ξηρότητος, οὐκ ἄδηλον· καὶ γὰρ ὁ ἀῆρ ὑγρὸν τὴν φύσιν ἐστίν. ὅτι δ' ὁμοίως ἐν τοῖς ὑγροῖς ποιεῖ καὶ ἐν τῷ αἵρι οἶον ἀποπλυνόμενον τὸ ξηρόν, φανερόν. ἔτι δεῖ ἀνάλογον εἶναι τὰς ὁσμὰς τοῖς χυμοῖς. ἀλλὰ μὴν τοῦτό γε ἐπ' ἐνίων συμβέβηκεν· καὶ γὰρ δριμεῖαι καὶ γλυκεῖαί εἰσιν
 10 ὁσμαι καὶ αὐστηραὶ καὶ στρυφναὶ καὶ λιπαραί, καὶ τοῖς πικροῖς τὰς σαπρὰς ἂν τις ἀνάλογον εἴποι. διὸ ὥσπερ ἐκείνα δυσκατάποτα, τὰ σαπρὰ δυσανά- πνευστά ἐστίν. δῆλον ἄρα ὅτι ὅπερ ἐν τῷ ὕδατι ὁ χυμός, τοῦτ' ἐν τῷ αἵρι καὶ ὕδατι ἡ ὁσμὴ. καὶ διὰ
 15 τοῦτο τὸ ψυχρὸν καὶ ἡ πῆξις καὶ τοὺς χυμοὺς ἀμβλύνει καὶ τὰς ὁσμὰς ἀφανίζει· τὸ γὰρ θερμὸν τὸ κινεῖν καὶ δημιουργοῦν ἀφανίζουσιν ἡ ψύξις καὶ ἡ πῆξις.

Εἶδη δὲ τοῦ ὁσφραντοῦ δύο ἐστίν· οὐ γὰρ ὥσπερ τινές φασιν, οὐκ ἐστὶν εἶδη τοῦ ὁσφραντοῦ, ἀλλ' ἐστίν. διοριστέον δὲ πῶς ἐστὶ καὶ πῶς οὐκ ἐστίν· τὸ μὲν γὰρ ἐστὶ κατὰ τοὺς χυμοὺς τεταγμένον

ON SENSE AND SENSIBLE OBJECTS, v.

organ to perceive it. The general attitude to smell includes those who regard it as steam, those who regard it as smoke and those who regard it as a mixture of the two. Steam is merely moisture, but smoky vapour, as has been said, is a mixture of air and earth ; from the first water only is formed, but from the latter some sort of earth. But probably smell is neither of these ; for steam consists of water, and smoky vapour cannot exist in water at all. But things in water have a sense of smell, as has been said before. Further the smoky vapour theory is like the theory of emanations. If the latter is unsound, so also is the former.

It is obvious that it is possible that the moisture both in air and in water absorbs the nature of and is affected by tastable dryness ; for air is by nature moist. It is obvious then that it produces in the wet, as in air, the effect of washing something dry. And smells must then be analogous to flavours. Moreover this certainly happens in some cases : for smells like flavours are pungent, sweet, harsh, astringent and rich, and one could call the fetid analogous to the bitter. So as these flavours are unpleasant to drink, so are the fetid unpleasant to inhale. It is clear then that smell in air and in water is the same thing as flavour in water alone. This is why cold and freezing blunts flavours, and causes smells to disappear ; for cold and freezing counteracts the heat which sets in motion and produces flavour.

But there are two kinds of objects smelt ; for it is untrue to say, as some do, that there are no different kinds of object smelt, for there are. But we must define in what sense there are, and in what sense there are not (kinds of smells). There is one kind of odour

Analogy
between
smell and
taste.

Objects
smelt are
of different
kinds.

443 b

20 αὐτῶν, ὥσπερ εἵπομεν, καὶ τὸ ἡδὺ καὶ τὸ λυπηρὸν
κατὰ συμβεβηκὸς ἔχουσιν· διὰ γὰρ τὸ τοῦ θρεπτικοῦ
πάθη εἶναι, ἐπιθυμούντων μὲν ἡδεῖαι αἱ ὁσμαι
τούτων εἰσὶ, πεπληρωμένοις δὲ καὶ μηδὲν δεομένοις
οὐχ ἡδεῖαι, οὐδ' ὅσοις μὴ καὶ ἡ τροφή ἡ ἔχουσα
25 τὰς ὁσμάς ἡδεῖα, οὐδὲ τούτοις. ὥστε αὐταὶ μὲν,
καθάπερ εἵπομεν, κατὰ συμβεβηκὸς ἔχουσι τὸ ἡδὺ
καὶ λυπηρὸν, διὸ καὶ πάντων εἰσὶ κοινὰ τῶν ζώων·
αἱ δὲ καθ' αὐτὰς ἡδεῖαι τῶν ὁσμῶν εἰσὶν, οἷον αἱ
30 τῶν ἀνθρώπων· οὐδὲν γὰρ μᾶλλον οὐδ' ἥττον πρὸς τὴν
τροφήν παρακαλοῦσιν, οὐδὲ συμβάλλεται πρὸς
ἐπιθυμίαν οὐδέν, ἀλλὰ τοῦναντίον μᾶλλον· ἀληθὲς
γὰρ ὅπερ Εὐριπίδην σκώπτων εἶπε Στράττις,
“ὅταν φακὴν εἴψητε, μὴ ᾽πιχεῖν¹ μύρον.” οἱ δὲ νῦν

444 a

μιγνύντες εἰς τὰ πόματα τὰς τοιαύτας δυνάμεις
βιάζονται τῇ συνηθείᾳ τὴν ἡδονήν, ἕως ἂν ἐκ δὺ
αἰσθήσεων γένηται τὸ ἡδὺ ὥς ἐν καὶ ἀπὸ μιᾶς.
τοῦτο μὲν οὖν τὸ ὁσφραντὸν ἴδιον ἀνθρώπου ἐστίν,
5 ἡ δὲ κατὰ τοὺς χυμοὺς τεταγμένη καὶ τῶν ἄλλων
ζώων, ὥσπερ εἴρηται πρότερον· κάκεινων μὲν, διὰ
τὸ κατὰ συμβεβηκὸς ἔχειν τὸ ἡδύ, διήρηται τὰ
εἶδη κατὰ τοὺς χυμούς, ταύτης δ' οὐκέτι, διὰ τὸ
τὴν φύσιν αὐτῆς εἶναι καθ' αὐτὴν ἡδεῖαν ἢ λυπηράν.

Αἴτιον δὲ τοῦ ἴδιον εἶναι ἀνθρώπου τὴν τοιαύτην
ὁσμὴν διὰ τὴν ψύξιν τὴν περὶ τὸν ἐγκεφάλον.
10 ψυχροῦ γὰρ ὄντος τὴν φύσιν τοῦ ἐγκεφάλου, καὶ
τοῦ αἵματος τοῦ περὶ αὐτὸν ἐν τοῖς φλεβίοις ὄντος
λεπτοῦ μὲν καὶ καθαροῦ, εὐψύκτου δέ (διὸ καὶ ἡ
τῆς τροφῆς ἀναθυμίασις ψυχομένη διὰ τὸν τόπον τὰ
νοσηματικὰ ρεύματα ποιεῖ), τοῖς ἀνθρώποις πρὸς

¹ ἐπιχεῖν B.

ON SENSE AND SENSIBLE OBJECTS, v.

which may be placed in the same category as flavours, as we have said, and to these the terms sweet and bitter belong incidentally ; for because they are affections of the nutritive faculty, these smells are pleasant when animals desire them, but when they are sated and do not need them they are not pleasant, nor is the smell pleasant to those animals to whom the food having the smell is unpleasant. So that these possess the qualities of sweetness or the reverse only incidentally, and in this way are common to all living creatures. Some smells are pleasant in themselves, for instance the smells of flowers ; for they do not act as an invitation to food either to a greater or a less extent, nor do they contribute anything to desire, but rather the opposite ; for what Strattis said in caricaturing Euripides is true, " When you make soup do not pour perfume over it." But those who mix flavours of this kind into beverages only force our enjoyment by habit, until pleasure arises from two senses as if it were a single pleasure from one. The pleasure derived from this kind of smell is peculiar to man, but that which is associated with flavours is shared by all other animals, as has been said before : the latter, because their sweetness is incidental, can be divided into classes, according to flavours, but the former cannot, because the sweetness, or the reverse, is part of its own nature in itself.

The reason why the former sense of smell is peculiar to man is due to the coldness which exists in the région of the brain. For the brain is naturally cold, and the blood in the veins surrounding it is light and pure, but easily cooled. (This is why the flavour arising from food, when it becomes cool, produces colds in the neighbourhood of the brain.) Man then

The function of the sense of smell.

444 a

15 βοήθειαν ὑγιείας γέγονε τὸ τοιοῦτον εἶδος τῆς ὁσμῆς· οὐδέν γὰρ ἄλλο ἔργον ἐστὶν αὐτῆς ἢ τοῦτο. τοῦτο δὲ ποιεῖ φανερώς· ἡ μὲν γὰρ τροφή ἡδεῖα οὔσα, καὶ ἡ ξηρὰ καὶ ἡ ὑγρὰ, πολλάκις νοσώδης ἐστίν, ἡ δ' ἀπὸ τῆς ὁσμῆς τῆς καθ' αὐτὴν εὐώδους ὅπως οὖν ἔχουσιν ὠφέλιμος ὥς εἰπεῖν αἰεί. καὶ διὰ
20 τοῦτο γίνεται διὰ τῆς ἀναπνοῆς, οὐ πᾶσιν ἀλλὰ τοῖς ἀνθρώποις καὶ τῶν ἐναίμων οἷον τοῖς τετράποσι καὶ ὅσα μετέχει μᾶλλον τῆς τοῦ αἵρος φύσεως· ἀναφερομένων γὰρ τῶν ὁσμῶν πρὸς τὸν ἐγκέφαλον διὰ τὴν ἐν αὐταῖς τῆς θερμότητος κουφότητα, ὑγιεινότερως ἔχει τὰ περὶ τὸν τόπον τοῦτον· ἡ γὰρ
25 τῆς ὁσμῆς δύναμις θερμὴ τὴν φύσιν ἐστίν.

Κατακέχρηται δ' ἡ φύσις τῇ ἀναπνοῇ ἐπὶ δύο, ὥς ἔργῳ μὲν ἐπὶ τὴν εἰς τὸν θώρακα βοήθειαν, ὥς παρέργῳ δ' ἐπὶ τὴν ὁσμὴν· ἀναπνέοντος γὰρ ὥσπερ ἐκ παρόδου ποιεῖται διὰ τῶν μυκτῆρων τὴν κίνησιν. ἴδιον δὲ τῆς τοῦ ἀνθρώπου φύσεώς ἐστι τὸ τῆς
80 ὁσμῆς τῆς τοιαύτης γένος διὰ τὸ πλεῖστον ἐγκέφαλον καὶ ὑγρότατον ἔχειν τῶν ζώων ὥς κατὰ μέγεθος· διὰ γὰρ τοῦτο καὶ μόνον ὥς εἰπεῖν αἰσθάνεται τῶν ζώων ἄνθρωπος καὶ χαίρει ταῖς τῶν ἀνθῶν καὶ ταῖς τῶν τοιούτων ὁσμαῖς· σύμμετρος
444 b γὰρ αὐτῶν ἡ θερμότης καὶ ἡ κίνησις πρὸς τὴν ὑπερβολὴν τῆς ἐν τῷ τόπῳ ὑγρότητος καὶ ψυχρότη-
τός ἐστιν. τοῖς δ' ἄλλοις ὅσα πλεύμονα ἔχει διὰ τὸ ἀναπνεῖν τοῦ ἐτέρου γένους τῆς ὁσμῆς τὴν αἰσθησιν ἀποδέδωκεν ἡ φύσις, ὅπως μὴ δύο αἰσθη-
5 τήρια ποιῇ. ἀπόχρη γάρ, ἐπεὶ περ καὶ ὥς ἀναπνέουσιν, ὥσπερ τοῖς ἀνθρώποις ἀμφοτέρων τῶν ὁσφραντῶν, τούτοις τῶν ἐτέρων μόνων ὑπάρχονσα.

ON SENSE AND SENSIBLE OBJECTS, v.

possesses this kind of smell for the benefit of his health ; for smell has no other function except this. And it obviously performs this function ; for food which is sweet, both dry and moist, is often unhealthy, whereas that which has a smell which is in itself pleasant is, generally speaking, beneficial to persons in any state of health. And for this reason it is conveyed by inhalation, not to everything, but to men and to the warm-blooded animals such as the four-footed beasts and those which have a larger share in the nature of air ; for as the smells reach the brain because of the lightness of the heat contained in them, the parts of the body near the brain are the healthier for these smells ; for the faculty of smell is naturally hot.

Nature employs respiration for two purposes, first, ^{Smell and breathing} and as its main function, for a protection to the throat, and in a secondary sense for the purpose of smell ; for when a living creature inhales smell, it enters through the movement of the nostrils as though from a side entrance. Smell of this type is peculiar to man, because he has the largest and moistest brain in proportion to his size of all animals ; and it is for this reason too that of all animals man alone is conscious of and enjoys the smell of flowers and such things ; for the heat and movement produced by these balances excess of wetness and coldness in the region of the body which apprehends them. But nature has allotted perception of the second class of smell to all the other animals which have lungs through respiration, to avoid making two separate sense organs ; for it is sufficient, since they breathe in this way, that man should have perception of both classes of things smelt, while animals should

ἡ αἴσθησις. τὰ δὲ μὴ ἀναπνέοντα, ὅτι μὲν ἔχει
 αἴσθησιν τοῦ ὀσφραντοῦ, φανερόν· καὶ γὰρ ἰχθύες
 καὶ τὸ τῶν ἐντόμων γένος πᾶν ἀκριβῶς καὶ πόρρω-
 10 θεν αἰσθάνεται, διὰ τὸ θρεπτικὸν εἶδος τῆς ὀσμῆς,
 ἀπέχοντα πολὺ τῆς οἰκείας τροφῆς, οἷον αἶ τε
 μέλιτται ποιοῦσι πρὸς τὸ μέλι καὶ τὸ τῶν μικρῶν
 μυρμηκῶν γένος, οὓς καλοῦσί τινες κνίπας, καὶ
 τῶν θαλαττίων αἱ πορφύραι, καὶ πολλὰ τῶν ἄλλων
 τῶν τοιούτων ζώων ὀξέως αἰσθάνεται τῆς τροφῆς
 15 διὰ τὴν ὀσμὴν. ὅτῳ δὲ αἰσθάνεται, οὐχ ὁμοίως
 φανερόν. διὸ καὶ ἀπορήσειέ τις τίνι αἰσθάνονται
 τῆς ὀσμῆς, εἴπερ ἀναπνέουσι μὲν γίνεται τὸ ὀσμά-
 σθαι μοναχῶς· τοῦτο γὰρ φαίνεται ἐπὶ τῶν ἀνα-
 πνεόντων συμβαῖνον πάντων, ἐκείνων δ' οὐθὲν ἀνα-
 πνεῖ αἰσθάνεται μέντοι, εἰ μὴ τις παρὰ τὰς
 20 πέντε αἰσθήσεις ἑτέρα. τοῦτο δ' ἀδύνατον· τοῦ
 γὰρ ὀσφραντοῦ ὀσφρησις, ἐκεῖνα δὲ τούτου αἰσθά-
 νεται,¹ ἀλλ' οὐ τὸν αὐτὸν ἴσως τρόπον, ἀλλὰ τοῖς
 μὲν ἀναπνέουσι τὸ πνεῦμα ἀφαιρεῖ τὸ ἐπικείμενον
 ὥσπερ πῶμά τι (διὸ οὐκ αἰσθάνεται μὴ ἀναπνέοντα),
 τοῖς δὲ μὴ ἀναπνέουσιν ἀφήρηται τοῦτο, καθάπερ
 25 ἐπὶ τῶν ὀφθαλμῶν τὰ μὲν ἔχει βλέφαρα τῶν ζώων,
 ὧν μὴ ἀνακαλυφθέντων οὐ δύναται ὁρᾶν, τὰ δὲ
 σκληρόφθαλμα οὐκ ἔχει, διὸπερ οὐ προσδεῖται
 οὐδενὸς τοῦ ἀνακαλύψοντος, ἀλλ' ὁρᾷ ἐκ τοῦ δυνα-
 τοῦ ὁρᾶν αὐτῷ εὐθύς. ὁμοίως δὲ καὶ τῶν ἄλλων
 ζώων ὅτι οὐκ οὐδὲν δυσχεραίνει τῶν καθ' αὐτὰ δυσω-
 30 δῶν τὴν ὀσμὴν, ἂν μὴ τι τύχη φθαρτικὸν ὂν. ὑπὸ
 τούτων δ' ὁμοίως φθείρεται καθάπερ καὶ οἱ ἄνθρω-
 ποι ὑπὸ τῆς τῶν ἀνθρώπων ἀτμίδος καρηβαροῦσι
 καὶ φθείρονται πολλάκις· οὕτως ὑπὸ τῆς τοῦ θείου

¹ αἰσθάνονται B.

ON SENSE AND SENSIBLE OBJECTS, v.

only perceive one. But it is clear that animals which do not breathe have perception of a scented object ; for fishes and the whole class of insects have a very accurate perception even at a distance, owing to the nutritive kind of smell, even when they are at a great distance from their proper food. For instance, bees show it about honey, and the class of small ants which some call aphids, and among marine animals the murex, and many other similar creatures have a keen perception of their food by its smell. But the organ whereby they have this perception is not so certain. So one might be in considerable doubt with what organ they apprehend smell, if smell can only exist when animals inhale ; that this occurs with all animals that breathe is obvious, but perhaps, since none of those under discussion breathes and yet can smell, there is another sense besides the accepted five. But this is impossible ; for a perception of odour is a sense of smell, and these animals do perceive it, but perhaps not in the same way ; but, in the case of animals which breathe, the breath removes something which lies on the organ like a kind of lid (and so they do not perceive smell unless they breathe), but in the case of non-breathing animals this is removed, just as is true of the eyes. Some animals have eyelids, and cannot see when these are shut, but the hard-eyed animals have no eyelids, and so do not need anything to uncover the eyes, but can see directly as soon as the object is within visible distance. Similarly in the case of other animals none of the essentially evil-smelling things offend them, unless they happen to be destructive. By these they are destroyed exactly in the same way as men get headaches, and are often even killed, by the gas arising from coals ; so the

Smelling
without
breathing.

445 a δυνάμεως καὶ τῶν ἀσφαλτωδῶν φθείρεται τᾶλλα
 ζῶα, καὶ φεύγει διὰ τὸ πάθος. αὐτῆς δὲ καθ'
 αὐτὴν τῆς δυσωδίας οὐδὲν φροντίζουσιν, καίτοι
 πολλὰ τῶν φυομένων δυσώδεις ἔχει τὰς ὀσμάς, εἰ
 μή τι συμβάλλεται πρὸς τὴν γεύσιν ἢ τὴν ἐδωδὴν
 5 αὐτοῖς. ἔοικε δ' ἡ αἴσθησις ἢ τοῦ ὀσφραίνεισθαι
 περιττῶν οὐσῶν τῶν αἰσθήσεων καὶ τοῦ ἀριθμοῦ
 ἔχοντος μέσον τοῦ περιττοῦ καὶ αὐτὴ μέση εἶναι
 τῶν τε ἀπτικῶν, οἷον ἀφῆς καὶ γεύσεως καὶ τῶν δι'
 ἄλλου αἰσθητικῶν, οἷον ὄψεως καὶ ἀκοῆς. διὸ καὶ
 τὸ ὀσφραντὸν τῶν θρεπτικῶν ἐστὶ πάθος τι (ταῦτα
 10 δ' ἐν τῷ ἀπτῷ γένει), καὶ τοῦ ἀκουστοῦ δὲ καὶ τοῦ
 ὄρατοῦ, διὸ καὶ ἐν ἀέρι καὶ ἐν ὕδατι ὀσμῶνται.
 ὥστ' ἐστὶ τὸ ὀσφραντὸν κοινόν τι τούτων ἀμφοτέ-
 ρων, ὃ καὶ τῷ ἀπτῷ ὑπάρχει καὶ τῷ ἀκουστῷ καὶ
 τῷ διαφανεῖ. διὸ εὐλόγως παρείκασται ξηρότητος
 ἐν ὑγρῷ καὶ χυτῷ οἷον βαφή τις εἶναι καὶ πλύσις.
 15 πῶς μὲν οὖν εἶδη δεῖ λέγειν καὶ πῶς οὐ δεῖ τοῦ
 ὀσφραντοῦ, ἐπὶ τοσοῦτον εἰρήσθω.

Ὁ δὲ λέγουσί τινες τῶν Πυθαγορείων, οὐκ ἔστιν
 εὐλογον· τρέφεσθαι γάρ φασιν ἔνια ζῶα ταῖς ὀσμαῖς.
 πρῶτον μὲν γὰρ ὀρώμεν ὅτι τὴν τροφήν δεῖ εἶναι
 σύνθετον· καὶ γὰρ τὰ τρεφόμενα οὐχ ἀπλᾶ ἐστίν,
 20 διὸ καὶ περιττώματα γίνεται τῆς τροφῆς, ἢ ἐν
 αὐτοῖς ἢ ἔξω, ὥσπερ τοῖς φυτοῖς. ἔτι δ' οὐδὲ τὸ
 ὕδωρ ἐθέλει αὐτὸ μόνον ἄμικτον ὃν τρέφειν· σω-
 ματῶδες γάρ τι δεῖ εἶναι τὸ συστηματόμενον. ἔτι
 πολὺ ἥττον εὐλογον τὸν ἀέρα σωματοῦσθαι. πρὸς
 δὲ τούτοις, ὅτι πᾶσιν ἐστὶ τοῖς ζώοις τόπος δεκτικὸς
 25 τῆς τροφῆς, ἐξ οὗ ἔλκον λαμβάνει τὸ σῶμα· τοῦ δ'
 ὀσφραντοῦ ἐν τῇ κεφαλῇ τὸ αἰσθητήριον, καὶ μετὰ

ON SENSE AND SENSIBLE OBJECTS, v.

other animals are destroyed by the power of sulphur and bitumen, and avoid such things because they affect them. But they care nothing for the unpleasant smell in itself (and yet many plants have offensive smells), if they do not contribute anything to their taste or food. As the number of the senses is odd, and an odd number always has a unit for its middle term, the sense of smell would seem to be the middle term of the senses of touch—I mean touch and taste on the one hand and on the other the senses which perceive through a medium, that is vision and hearing. So the object of smell is an affection of substances used for food (for these belong to the class of tangible objects), and also an affection of what is heard and seen. Consequently smell occurs in air and water. So smell is common to both these, that is, it belongs to touch and also to hearing and the transparent; so it is a reasonable conjecture that it is a dipping or washing of the dry in the wet and liquid. Let this be a sufficient account of the extent to which we can and cannot describe the forms of smell.

But the theory advanced by some of the Pythagoreans is not reasonable; for they say that some animals are nourished by smells. For first of all we see that food must be composite; for the animals nourished are not simple, and for this reason there is waste matter left over from food either in the bodies themselves or outside as in plants; even water cannot serve for food, if it is unmixed; for there must be something corporeal to make it cohere. It is even less probable that air can be made corporeal. In addition to this, it is evident that all animals possess a region which receives the food, from which the body draws it. Now the sense organ of smell lies in

The
supposed
nutritive
function
of smell.

445 a

πνευματώδους εισέρχεται ἀναθυμιάσεως, ὥστ' εἰς
 τὸν ἀναπνευστικὸν βαδίζοι ἂν τόπον. ὅτι μὲν οὖν
 οὐ συμβάλλεται εἰς τροφήν τὸ ὀσφραντόν, ἢ ὀσφραν-
 τόν, δηλόν· ὅτι μέντοι εἰς ὑγίειαν, καὶ ἐκ τῆς
 30 αἰσθήσεως καὶ ἐκ τῶν εἰρημένων φανερόν, ὥστε
 ὅπερ ὁ χυμὸς ἐν τῷ θρεπτικῷ καὶ πρὸς τὰ τρεφό-
 445 b μενα, τοῦτ' ἐστὶ πρὸς ὑγίειαν τὸ ὀσφραντόν. καθ'
 ἕκαστον μὲν οὖν αἰσθητήριον διωρίσθω τὸν τρόπον
 τοῦτον.

VI. Ἀπορήσειε δ' ἂν τις, εἰ πᾶν σῶμα εἰς ἄπει-
 ρον διαιρεῖται, ἄρα καὶ τὰ παθήματα τὰ αἰσθητά,
 5 οἷον χρῶμα καὶ χυμὸς καὶ ὀσμὴ καὶ βάρος καὶ
 ψόφος καὶ ψυχρόν καὶ θερμόν καὶ κοῦφον καὶ
 σκληρόν καὶ μαλακόν; ἢ ἀδύνατον· ποιητικὸν γάρ
 ἐστὶν ἕκαστον αὐτῶν τῆς αἰσθήσεως· τῷ δύνασθαι
 γὰρ κινεῖν αὐτὴν λέγεται πάντα. ὥστ' ἀνάγκη τήν
 τε αἰσθησιν εἰς ἄπειρα διαιρεῖσθαι καὶ πᾶν εἶναι
 10 μέγεθος αἰσθητόν· ἀδύνατον γὰρ λευκὸν μὲν ὄρᾶν,
 μὴ ποσὸν δέ. εἰ γὰρ μὴ οὕτως, ἐνδέχουτ' ἂν εἶναι
 τι σῶμα μηδὲν ἔχον χρῶμα μηδὲ βάρος μηδ' ἄλλο
 τι τοιοῦτον πάθος. ὥστ' οὐδ' αἰσθητόν ὅλως·
 ταῦτα γὰρ τὰ αἰσθητά. τὸ ἄρ' αἰσθητόν ἐσται
 συγκεείμενον οὐκ ἐξ αἰσθητῶν. ἀλλ' ἀναγκαῖον· οὐ
 15 γὰρ δὴ ἔκ γε τῶν μαθηματικῶν. ἔτι τίνοι κρινοῦμεν
 ταῦτα ἢ γνωσόμεθα; ἢ τῷ νῷ; ἀλλ' οὐ νοητά,
 οὐδὲ νοεῖ ὁ νοῦς τὰ ἐκτὸς μὴ μετ' αἰσθήσεως ὄντα.
 ἅμα δ' εἰ ταῦτ' ἔχει οὕτως, ἔοικε μαρτυρεῖν τοῖς τὰ
 254

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the head, and smell enters at the same time as a vapour inhaled with the breath, so that it must go to some place which the breath reaches. So it is obvious that smell *qua* smell does not contribute to food; but it is equally clear, both from our own sensation and from what we have already said, that it does contribute to health, so that the function performed by flavour in nutrition and for what is nourished, is performed by smell for health in general. Let this then suffice for an account of each sense organ.

VI. A difficulty might arise as to whether, if every body is susceptible of infinite division, the attributes perceived are also so susceptible, I mean colour, flavour, smell, weight, sound, as well as cold and hot, light, hard and soft. Perhaps this is impossible; for each of these produces sensation; in fact they all derive their names from their capacity to effect this impulse. Then on the above assumption sensation must be capable of infinite division, and every magnitude must be perceptible; for it is impossible to see "white" without a magnitude which is white. Otherwise it would be possible for a body to exist which had neither colour nor weight, nor any other attribute. But in this case it could not be perceptible at all; for things perceptible are those enumerated above. In this case every perceptible body will consist of imperceptible parts. But its parts must be perceptible; for they cannot consist of mathematical abstractions. Again, by what faculty should we judge or recognize these? By the mind? But they are not apprehended by the mind, nor does the mind recognize any external objects, except those which are combined with sensation. At the same time, if this is true, it favours the assumption of those who

Can sensation be infinitely divided?

If so, what is the meaning of an imperceptible part?

445 b

ἄτομα ποιουῦσι μεγέθη· οὕτω γὰρ ἂν λύοιτο ὁ λόγος.
 20 ἀλλ' ἀδύνατα· εἴρηται δὲ περὶ αὐτῶν ἐν τοῖς λόγοις
 τοῖς περὶ κινήσεως. περὶ δὲ τῆς λύσεως αὐτῶν
 ἅμα δῆλον ἔσται καὶ διὰ τί πεπεράνται τὰ εἶδη καὶ
 χρώματος καὶ χυμοῦ καὶ φθόγγων καὶ τῶν ἄλλων
 αἰσθητῶν. ὧν μὲν γὰρ ἔστιν ἔσχατα, ἀνάγκη
 πεπεράνθαι τὰ ἐντός· τὰ δ' ἐναντία ἔσχατα. πᾶν
 25 δὲ τὸ αἰσθητὸν ἔχει ἐναντίωσιν, οἷον ἐν χρώματι τὸ
 λευκὸν καὶ τὸ μέλαν, ἐν χυμῷ γλυκὺ καὶ πικρὸν·
 καὶ ἐν τοῖς ἄλλοις δὴ πᾶσιν ἔστιν ἔσχατα τὰ ἐναν-
 τία. τὸ μὲν οὖν συνεχές εἰς ἄπειρα τέμνεται
 ἄνισα, εἰς δ' ἴσα πεπερασμένα· τὸ δὲ μὴ καθ'
 80 αὐτὸ συνεχές εἰς πεπερασμένα εἶδη. ἐπεὶ οὖν τὰ
 μὲν πάθη ὡς εἶδη λεκτέον, ὑπάρχει δὲ συνέχεια
 αἰ ἐν τούτοις, ληπτέον ὅτι τὸ δυνάμει καὶ τὸ
 ἐνεργείᾳ ἕτερον· καὶ διὰ τοῦτο τὸ μυριοστημόριον
 448 a λανθάνει τῆς κέγχρου ὀρωμένης, καίτοι ἡ ὄψις
 ἐπελήλυθεν, καὶ ὁ ἐν τῇ διέσει φθόγγος λανθάνει,
 καίτοι συνεχοῦς ὄντος ἀκούει τοῦ μέλους παντός.
 τὸ δὲ διάστημα τὸ τοῦ μεταξὺ πρὸς τοὺς ἐσχάτους
 λανθάνει. ὁμοίως δὲ καὶ ἐν τοῖς ἄλλοις αἰσθητοῖς
 5 τὰ μικρὰ πάμπαν· δυνάμει γὰρ ὁρατά, ἐνεργείᾳ δ'
 οὐ, ὅταν μὴ χωρὶς ἧ¹. καὶ γὰρ ἐνυπάρχει δυνάμει
 ἡ ποδιαία τῇ δίποδι, ἐνεργείᾳ δ' ἤδη διαιρεθεῖσα.
 χωριζόμεναι δ' αἱ τηλικαῦται ὑπεροχαὶ εὐλόγως
 μὲν ἂν καὶ διαλύοιντο εἰς τὰ περιέχοντα, ὥσπερ
 10 καὶ ἀκαριαῖος χυμὸς εἰς τὴν θάλατταν ἐκχυθεῖς.
 οὐ μὴν ἄλλ' ἐπειδὴ οὐδ' ἡ τῆς αἰσθήσεως ὑπεροχὴ

¹ χωρισθῇ B.^a What we call the *Physics*.

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support the theory of atoms ; for our difficulty might be solved on these lines ; the theory has been discussed in the treatise on movement.^a The solution of these questions will make it clear why the types of colour, flavour, sounds, and other sensible objects are limited ; for where there are limits, the intermediate stages must be limited ; but the opposites are extremes. But every sensible object involves an opposition, for instance in colour white and black, in flavour sweet and bitter ; and in all other sensible objects opposites are the extremes. Now what is continuous can be divided into an infinite number of unequal parts, but into a limited number of equal parts ; but that which is not in itself continuous can be divided into a limited number of kinds. Since then the attributes in question may be spoken of as kinds, and continuity is one of their natural characteristics, one must consider the difference between the potential and the actual ; it is for this reason, when a grain of millet is looked at, that the ten-thousandth part of the grain cannot be seen, and yet vision has covered it all, and the quarter-tone cannot be recognized, although one can hear the whole tune as continuous. But the interval between the extremes is not recognized. The same thing is true of all very small quantities in the other sensible objects ; potentially they are seen but not actually, unless they are isolated from the whole. Potentially the one-foot length exists in the two-foot length, but actually only when separated from it. But it is only natural that increments of this kind should be merged in their environment, just as an evanescent flavour when poured into the sea. But it is important to realize that the increment of sense is not perceptible by

Very small parts must be potentially if not actually perceptible.

446 a

καθ' αὐτὴν αἰσθητὴ οὐδὲ χωριστὴ (δυνάμει γὰρ ἐνυπάρχει ἐν τῇ ἀκριβεστέρα ἢ ὑπεροχῇ), οὐδὲ τὸ τηλικούτον αἰσθητὸν χωριστὸν ἔσται ἐνεργείᾳ αἰσθῆσθαι, ἀλλ' ὅμως ἔσται αἰσθητόν· δυνάμει τε
 15 γάρ ἐστιν ἤδη, καὶ ἐνεργείᾳ ἔσται προσγενόμενον. ὅτι μὲν οὖν ἔνια μεγέθη καὶ πάθη λανθάνει, καὶ διὰ τίν' αἰτίαν, καὶ πῶς αἰσθητὰ καὶ πῶς οὐ, εἴρηται. ὅταν δὲ δὴ ἐνυπάρχοντα οὕτω πως ἅττα ᾗ ὥστε καὶ ἐνεργείᾳ αἰσθητὰ εἶναι, καὶ μὴ μόνον ἐν τῷ ὅλῳ ἀλλὰ καὶ χωρὶς ἢ πεπερασμένα, ἀνάγκη
 20 εἶναι τὸν ἀριθμὸν καὶ χρώματα καὶ χυμοὺς καὶ φθόγγους.

Ἀπορήσειε δ' ἂν τις, ἄρ' ἀφικνοῦνται ἢ τὰ αἰσθητὰ ἢ αἱ κινήσεις αἱ ἀπὸ τῶν αἰσθητῶν, ὅπο-
 τέως ποτὲ γίνεται ἡ αἰσθησις, ὅταν ἐνεργῶσιν, εἰς
 τὸ μέσον πρῶτον, οἷον ἢ τε ὁσμὴ φαίνεται ποιούσα
 καὶ ὁ ψόφος· πρότερον γὰρ ὁ ἐγγὺς αἰσθάνεται τῆς
 25 ὁσμῆς, καὶ ὁ ψόφος ὕστερον ἀφικνεῖται τῆς πληγῆς.
 ἄρ' οὖν οὕτω καὶ τὸ ὀρώμενον καὶ τὸ φῶς; καθ-
 ἅπερ καὶ Ἐμπεδοκλῆς φησὶν ἀφικνεῖσθαι πρότερον
 τὸ ἀπὸ τοῦ ἡλίου φῶς εἰς τὸ μεταξὺ πρὶν πρὸς
 τὴν ὄψιν ἢ ἐπὶ τὴν γῆν. δόξειε δ' ἂν εὐλόγως
 τοῦτο συμβαίνειν· τὸ γὰρ κινούμενον κινεῖταιί ποθέν
 30 ποι, ὥστ' ἀνάγκη εἶναί τινα καὶ χρόνον ἐν ᾧ κινεῖται

446 b

ἐκ θατέρου πρὸς θάτερον· ὁ δὲ χρόνος πᾶς δι-
 αιρετός, ὥστε ἦν ὅτε οὐπω ἑωρᾶτο ἀλλ' ἔτ' ἐφέρετο
 ἢ ἀκτὶς ἐν τῷ μεταξύ. καὶ εἰ ἅπαν ἅμα ἀκούει
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itself, or in isolation (for this movement has only potential existence in more distinguishable sense perception), nor will it be possible actually to perceive a sensible object of this kind when it is separated from the whole, yet it is a sensible object; for it is so potentially, and will become so actually when joined to the whole. We have then stated that some magnitudes and some attributes escape us; we have explained the reason for this, and the sense in which they are sensible objects, and the sense in which they are not. But since some of these exist in such a way that they become actually perceptible, and have a determinate existence not merely in the whole, but even in isolation, it follows that colours, flavours and sounds must be limited in number.

There is a further question to be considered: do these sensible objects, or the movements arising from them (in whichever way sensation arises), come first to a mid-point when they become actual, as smell and sound seem to do? For the man nearer to it is the first to perceive the smell, and the sound of the blow reaches us after the blow has been struck. Is the same thing true of the object seen and the light? Empedocles for instance states that the light from the sun reaches an intermediate point, before it reaches the vision, or the earth. This sounds a probable account of what happens; for that which is moved is moved from some source, and in some direction, so that some interval of time must elapse in which the movement takes place from the one point to the other. But all time is divisible, so that an interval existed during which the light was not yet seen, but the ray was still moving in the intermediate space. And even supposing that "hearing" and "having

Does a perceptible object become first potentially and then actually perceptible?

καὶ ἀκήκοε καὶ ὅλως αἰσθάνεται καὶ ᾗσθηται, καὶ
 μή ἐστι γένεσις αὐτῶν, ἀλλ' εἰσὶν ἄνευ τοῦ γίνεσθαι
 5 ὅμως οὐδὲν ἦττον, ὥσπερ ὁ ψόφος ἤδη γεγεννημένης
 τῆς πληγῆς οὐπω πρὸς τῇ ἀκοῇ. δηλοῖ δὲ τοῦτο
 καὶ ἡ τῶν γραμμάτων μετασχημάτισις, ὡς γιγιο-
 μένης τῆς φορᾶς ἐν τῷ μεταξύ· οὐ γὰρ τὸ λεχθὲν
 φαίνονται ἀκηκοότες διὰ τὸ μετασχηματίζεσθαι
 φερόμενον τὸν ἀέρα. ἀρ' οὖν οὕτω καὶ τὸ χρώμα
 10 καὶ τὸ φῶς; οὐ γὰρ δὴ τῷ πῶς ἔχειν τὸ μὲν ὄρα
 τὸ δ' ὄραται, ὥσπερ ἴσα ἐστίν· οὐθὲν γὰρ ἔδει που
 ἐκάτερον εἶναι· τοῖς γὰρ ἴσοις γινομένοις οὐδὲν
 διαφέρει ἢ ἐγγὺς ἢ πόρρω ἀλλήλων εἶναι. ἢ περὶ
 μὲν τὸν ψόφον καὶ τὴν ὁσμὴν τοῦτο συμβαίνειν
 εὐλογον· ὥσπερ γὰρ ὁ ἀῆρ καὶ τὸ ὕδωρ, συνεχῇ
 15 μὲν, ἀλλ' ὅμως μεμέρισται ἀμφοτέρων ἡ κίνησις.
 διὸ καὶ ἔστι μὲν ὡς τὸ αὐτὸ ἀκούει ὁ πρῶτος καὶ
 ὁ ὕστερος καὶ ὁσφραίνεται, ἔστι δ' ὡς οὐ. δοκεῖ
 δέ τισιν εἶναι ἀπορία καὶ περὶ τούτων· ἀδύνατον
 γὰρ φασί τινες ἄλλον ἄλλω τὸ αὐτὸ ἀκούειν ἢ ὄραν
 20 καὶ ὁσφραίνεσθαι· οὐ γὰρ οἶόν τ' εἶναι πολλοὺς
 καὶ χωρὶς ὄντας ἀκούειν ἢ ὁσφραίνεσθαι· τὸ γὰρ
 ἐν χωρὶς ἂν αὐτὸ αὐτοῦ εἶναι. ἢ τοῦ μὲν κινή-
 σαντος πρῶτον, οἶον τῆς κώδωνος ἢ λιβανωτοῦ ἢ
 πυρός, τοῦ αὐτοῦ καὶ ἐνὸς ἀριθμῷ αἰσθάνονται
 πάντες, τοῦ δὲ δὴ ἰδίου ἐτέρου ἀριθμῷ, εἶδει δὲ
 τοῦ αὐτοῦ, διὸ ἅμα πολλοὶ ὁρώσι καὶ ὁσμῶνται

^a A. is thinking of a word incorrectly heard. He supposes that the air through which the word is transmitted takes a definite "shape." When this "shape" is altered the word reaches the listener incorrectly.

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heard," "feeling" and "having felt" are simultaneous, and involve no process of becoming, but exist without any such process, nevertheless the interval still exists, just as sound has not yet reached our ear, although the blow causing it has been struck. The alteration in the letters of a word as heard proves that some movement takes place in the intervening space ;^a for the reason why the listener does not hear what is said, is that air in moving towards him has undergone some change. Is the same thing true of colour and light ? For it is not true that the one sees, and the other is seen, just because the two are in a certain condition, as if they were equal ; for in that case there would be no need for each of them to be in some particular place ; for when things are identical it makes no difference whether they are near to or far from one another. Now it is reasonable to suppose that the same thing happens with sound and smell ; for just as their media, air and water, are continuous, so are they, and yet the movement of both is divided into parts. And so there is a sense in which the first and last hear and smell the same thing, and also a sense in which they do not. But some find a further difficulty in this ; for they say that it is impossible for one person to hear, or see, or smell the same thing as another ; for they argue that it is impossible for many people who are apart from one another to hear or smell the same thing ; for in that case one thing would be apart from itself. The cause of the original movement such as the bell, or the incense, or the fire, which all perceive is the same and numerically one, but each perceives a quality which is different numerically though the same in form, for many see, smell, or hear it at the same time. These

In what sense can two persons perceive the same thing?

446 b

25 καὶ ἀκούουσιν. ἔστι δ' οὔτε σώματα ταῦτα, ἀλλὰ πάθος καὶ κίνησις τις (οὐ γὰρ ἂν τοῦτο συνέβαινεν), οὐτ' ἄνευ σώματος.

Περὶ δὲ τοῦ φωτὸς ἄλλος λόγος· τῷ εἶναι γάρ τι φῶς ἐστίν, ἀλλ' οὐ κίνησις τις. ὅλως δὲ οὐδὲ ὁμοίως ἐπὶ τε ἀλλοιώσεως ἔχει καὶ φορᾶς· αἱ μὲν
30 γὰρ φοραὶ εὐλόγως εἰς τὸ μεταξὺ πρῶτον ἀφ-
447 a ικνοῦνται (δοκεῖ δ' ὁ ψόφος εἶναι φερομένου τινὸς κίνησις), ὅσα δ' ἀλλοιοῦνται, οὐκέτι ὁμοίως· ἐν-
δέχεται γὰρ ἀθρόον ἀλλοιοῦσθαι, καὶ μὴ τὸ ἥμισυ πρότερον, οἷον τὸ ὕδωρ ἅμα πᾶν πήγνυσθαι. οὐ μὴν ἀλλ' ἂν ἥ πολὺ τὸ θερμαινόμενον ἢ πηγνύ-
5 μενον, τὸ ἐχόμενον ὑπὸ τοῦ ἐχομένου πάσχει, τὸ δὲ πρῶτον ὑπ' αὐτοῦ τοῦ ἀλλοιοῦντος μεταβάλλει, καὶ οὐκ ἀνάγκη ἅμα ἀλλοιοῦσθαι καὶ ἀθρόον. ἦν δ' ἂν καὶ τὸ γεύεσθαι ὥσπερ ἡ ὁσμή, εἰ ἐν ὑγρῷ ἤμεν καὶ πορρωτέρω ἔτι πρὶν θιγεῖν αὐτοῦ ἡσθανόμεθα. εὐλόγως δ' ὦν ἐστὶ μεταξὺ τοῦ αἰσθητηρίου,
10 οὐχ ἅμα πάντα πάσχει, πλὴν ἐπὶ τοῦ φωτὸς διὰ τὸ εἰρημένον. διὰ τὸ αὐτὸ δὲ καὶ ἐπὶ τοῦ ὁρᾶν· τὸ γὰρ φῶς ποιεῖ τὸ ὁρᾶν.

VII. Ἔστι δέ τις ἀπορία καὶ ἄλλη τοιάδε περὶ αἰσθήσεως, πότερον ἐνδέχεται δυοῖν¹ ἅμα αἰσθάνεσθαι ἐν τῷ αὐτῷ καὶ ἀτόμῳ χρόνῳ, ἢ οὐ, εἰ δὴ
15 αἰεὶ ἡ μείζων κίνησις τὴν ἐλάττω ἐκκρούει· διὸ ἐπιφερομένων ἐπὶ τὰ ὄμματα οὐκ αἰσθάνονται, εἰάν τύχῃσι σφόδρα τι ἐννοοῦντες ἢ φοβούμενοι ἢ ἀκούοντες πολὺν ψόφον. τοῦτο δὴ ὑποκείσθω, καὶ ὅτι ἐκάστου μᾶλλον ἔστιν αἰσθάνεσθαι ἀπλοῦ

¹ διενεῖν B.

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are not bodies, but are an affection or movement of some kind (for otherwise it would not occur), though not apart from a body.

The position with regard to light is different; for light is an existing thing, and is not a movement. Light is a special case. Generally speaking, change of state and travel in space are different; for spatial movements naturally travel first in the intervening space (and sound appears to be the movement of something travelling), but with things which change their state the position is not the same; for it is possible that such change of state should occur in a thing all at once, and not in half first; for instance, water may all freeze at one time. It must, however, be admitted that when much of it grows hot or freezes, each part is affected by the next, and the first part owes its change to that which produces the change, and it need not change all at the same time together. Tasting indeed would be like smelling, if we lived in water, and perceived at a distance before making contact. But naturally those senses which act through a medium are not all affected simultaneously, except in the case of light for the reason given, and for the same reason it is true of seeing, for light causes seeing.

VII. There is a further question about sensation, whether it is possible to perceive two things in one and the same indivisible time or not; or in other words, does the greater movement eliminate the lesser? For men do not see things impinging on their eyes, if they happen to be concentrating on some thought, or in a state of fear, or listening to a loud noise. Let this be granted, and also that it is more possible to perceive each individual thing when simple, than when mixed with another. For instance

Can two things be perceived simultaneously?

447 ^a ὄντος ἢ κεκραμένου, οἶον οἴνου ἀκράτου ἢ κεκρα-
 20 μένου, καὶ μέλιτος, καὶ χροᾶς, καὶ τῆς νήτης μόνης
 ἢ ἐν τῷ διὰ πασῶν, διὰ τὸ ἀφανίζειν ἄλληλα.
 τοῦτο δὲ ποιεῖ ἐξ ὧν ἔν τι γίνεται. εἰ δὴ ἡ μείζων
 τὴν ἐλάττω κίνησιν ἐκκρούει, ἀνάγκη, ἂν ἅμα
 ὦσι, καὶ αὐτὴν ἦττον αἰσθητὴν εἶναι ἢ εἰ μόνη
 ἦν· ἀφαιρεῖται γάρ τι ἢ ἐλάττων μιγνυμένη, εἴπερ
 25 ἅπαντα τὰ ἀπλᾶ μᾶλλον αἰσθητά ἐστίν. ἐὰν ἄρα
 ἴσαι ὧσιν ἕτεραι οὔσαι, οὐδετέρας ἔσται αἰσθησις·
 ἀφανιεῖ γὰρ ἡ ἑτέρα ὁμοίως τὴν ἑτέραν. ἀπλῆς
 δ' οὐκ ἔστιν αἰσθάνεσθαι. ὥστε ἡ οὐδεμία ἔσται
 αἰσθησις ἢ ἄλλη ἐξ ἀμφοῖν. ὅπερ καὶ γίνεσθαι
 δοκεῖ ἐκ τῶν κεραννυμένων ἐν ᾧ ἂν μιχθῶσιν.
 ἐπεὶ οὖν ἐκ μὲν ἐνίων γίνεται τι, ἐκ δ' ἐνίων οὐ
 30 γίνεται, τοιαῦτα δὲ τὰ ὑφ' ἑτέραν αἰσθησιν·
 447 ^b (μίγνυνται γὰρ ὧν τὰ ἔσχατα ἐναντία¹. οὐκ ἔστι δ'
 ἐκ λευκοῦ καὶ ὀξέος ἐν γενέσθαι ἄλλ' ἢ κατὰ
 συμβεβηκός, ἀλλ' οὐχ ὥς ἐξ ὀξέος καὶ βαρέος
 συμφωνία·) οὐκ ἄρα οὐδ' αἰσθάνεσθαι ἐνδέχεται
 αὐτῶν ἅμα. ἴσαι μὲν γὰρ οὔσαι αἱ κινήσεις ἀφα-
 5 νιοῦσιν ἀλλήλας, ἐπεὶ μία οὐ γίνεται ἐξ αὐτῶν.
 ἐὰν δ' ἄνισοι, ἢ κρείττων αἰσθησιν ἐμποιήσῃ, ἐπεὶ
 μᾶλλον ἅμα δυοῖν² αἰσθοιτ' ἂν ἡ ψυχὴ τῇ μιᾷ
 αἰσθήσῃ ὧν μία αἰσθησις, οἶον ὀξέος καὶ βαρέος·

¹ ἐν B.² δυεῖν B.

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it is easier to taste pure wine than wine mixed with water, and so also with honey, or with colour ; and the lowest of the strings is easier to hear by itself than when mixed with the octave, because the different notes neutralize each other. This always happens with individual things out of which one whole is formed. If then the greater movement eliminates the less, it follows that, if they occur together, the greater must be less perceptible than if it occurs alone ; for the lesser when mixed with it subtracts something, since all simple things are more perceptible. If then the different movements are exactly equal, there can be no perception of either ; for each will similarly efface the other. But it is impossible in this case to perceive either in its simple form. So that either there is no perception at all, or else there is perception of something formed from the two and different from either. This result seems actually to occur when two things are mixed in whatever way they are combined. From some things, then, one whole is produced, from others it is not, and to the latter class belong all such things as come under different senses (for amalgamation can only take place with things whose extremes are contraries ; so no single whole can be formed from white and sharp, except incidentally, for there is no harmony possible, as with high and low) ; and so it is impossible also to perceive these together. The movements, if equal, will efface each other, when one impulse does not arise from them. But if they are not equal the greater will provoke sensation, since the soul would be more likely to perceive two things at the same time with one sense perception, if the things both belong to the same sense perception,

447 b

μᾶλλον γὰρ ἅμα ἢ κίνησις τῆς μιᾶς ταύτης ἢ τοῖν δυοῖν, οἷον ὄψεως καὶ ἀκοῆς.

- 10 Τῇ μιᾷ δὲ ἅμα δυοῖν οὐκ ἔστιν αἰσθάνεσθαι ἂν μὴ μιχθῇ· τὸ γὰρ μίγμα ἐν βούλεται εἶναι, τοῦ δ' ἐνὸς μία αἴσθησις, ἢ δὲ μία ἅμα αὐτῇ. ὥστ' ἐξ ἀνάγκης τῶν μεμιγμένων ἅμα αἰσθάνεται, ὅτι μιᾷ αἰσθήσει κατ' ἐνέργειαν αἰσθάνεται· ἐνὸς μὲν γὰρ ἀριθμῷ ἢ κατ' ἐνέργειαν μία, εἶδει δὲ ἢ κατὰ
- 15 δύναμιν μία. καὶ εἰ μία τοίνυν ἡ αἴσθησις ἢ κατ' ἐνέργειαν, ἐν ἐκείνῃ ἐρεῖ. μεμίχθαι ἄρα ἀνάγκη αὐτά. ὅταν ἄρα μὴ τῇ μεμιγμένα, δύο ἔσονται αἰσθήσεις αἱ κατ' ἐνέργειαν. ἀλλὰ κατὰ μίαν δύναμιν καὶ ἄτομον χρόνον μίαν ἀνάγκη εἶναι τὴν ἐνέργειαν· μιᾶς γὰρ εἰσάπαξ μία κίνησις καὶ
- 20 χρήσις, μία δὲ ἡ δύναμις. οὐκ ἄρα ἐνδέχεται δυοῖν ἅμα αἰσθάνεσθαι τῇ μιᾷ αἰσθήσει. ἀλλὰ μὴν εἰ τὰ ὑπὸ τὴν αὐτὴν αἴσθησιν ἅμα ἀδύνατον, ἐὰν τῇ δύο, δῆλον ὅτι ἦττον ἔτι τὰ κατὰ δύο αἰσθήσεις ἐνδέχεται ἅμα αἰσθάνεσθαι, οἷον λευκὸν καὶ γλυκύ. φαίνεται γὰρ τὸ μὲν τῷ ἀριθμῷ ἐν ἡ ψυχῇ οὐδενὶ
- 25 ἐτέρῳ λέγειν ἀλλ' ἢ τῷ ἅμα, τὸ δὲ τῷ εἶδει ἐν τῇ κρινούσῃ αἰσθήσει καὶ τῷ τρόπῳ. λέγω δὲ τοῦτο, ὅτι ἴσως τὸ λευκὸν καὶ τὸ μέλαν, ἕτερον τῷ εἶδει ὄν, ἢ αὐτὴ κρίνει, καὶ τὸ γλυκὺ καὶ τὸ

^a A. seems to mean this. If you look at (e.g.) two white objects and are conscious of them as two white objects you are receiving not one impression, but two, and therefore cannot receive both with one sense faculty simultaneously. If the two white objects give only a general impression of white (i.e. specifically or as a class), then your sense faculty may be one, but it is only potential and not actualized.

ON SENSE AND SENSIBLE OBJECTS, VII.

such as high and low ; for the simultaneous movement of this one sensation is greater than it would be in the case of two, such as vision and hearing.

But it is not possible to perceive two objects with one sense, unless they are amalgamated ; for the amalgamation tends to make one whole, and there is one sensation of the unit, and this one sensation of course coincides with itself. So that there is necessarily simultaneous perception of the objects amalgamated, because the soul actually perceives with one sensation ; for the sensation which is actually a unit is of something numerically also a unit, but, of an object one only in species, the faculty is only potentially a unit.^a Whereas if the faculty is actually one, it will call its objects one. And so they must be amalgamated. When they are not amalgamated, the actual sensations will be two. But in the case of a single faculty in an indivisible moment of time, the activity must be single ; for the movement and employment of one faculty at a single instant implies that the activity is one, and the faculty in this case is only one. It is not then possible to perceive two objects with a single sensation. Moreover if it is impossible to perceive two things at the same moment which fall under the same sense, it is clear that it is still more impossible to perceive simultaneously two things which fall under two senses, such as white and sweet. For the soul cannot refer to what is numerically one in any way except simultaneously, but that which is specifically one, it refers to with discriminating sense and method. I mean this : that probably the same sense pronounces judgement on white and black, which are specifically different, and on sweet and bitter ; the same sense

Two objects cannot be seen as two with one sense.

147 b πικρόν, ἢ αὐτὴ μὲν ἑαυτῇ, ἐκείνης δ' ἄλλη, ἀλλ'
 ἐτέρως ἐκάτερον τῶν ἐναντίων, ὥς δ' αὐτως ἑαυταῖς
 30 τὰ σύστοιχα, οἷον ὥς ἡ γεῦσις τὸ γλυκὺ, οὕτως
 148 a ἡ ὄψις τὸ λευκόν· ὥς δ' αὕτη τὸ μέλαν, οὕτως
 ἐκείνη τὸ πικρόν.

Ἔτι εἰ αἱ τῶν ἐναντίων κινήσεις ἐναντίαι, ἅμα
 δὲ τὰ ἐναντία ἐν τῷ αὐτῷ καὶ ἀτόμῳ οὐκ ἐνδέχεται
 ὑπάρχειν, ὑπὸ δὲ τὴν αἴσθησιν τὴν μίαν ἐναντία
 6 ἐστίν, οἷον γλυκὺ πικρῷ, τούτων οὐκ ἂν ἐνδέχοιτο
 αἰσθάνεσθαι ἅμα. ὁμοίως δὲ δῆλον ὅτι οὐδὲ τὰ
 μὴ ἐναντία· τὰ μὲν γὰρ τοῦ λευκοῦ τὰ δὲ τοῦ
 μέλανός ἐστιν, καὶ ἐν τοῖς ἄλλοις ὁμοίως, οἷον
 τῶν χυμῶν οἱ μὲν τοῦ γλυκέος οἱ δὲ τοῦ πικροῦ.
 οὐδὲ τὰ μεμιγμένα ἅμα (λόγοι γάρ εἰσιν ἀντι-
 10 κειμένων, οἷον τὸ διὰ πασῶν καὶ τὸ διὰ πέντε), ἂν
 μὴ ὥς ἐν αἰσθάνηται. οὕτως δ' εἰς λόγος ὁ τῶν
 ἄκρων γίνεται, ἄλλως δ' οὔ· ἔσται γὰρ ἅμα ὁ
 μὲν πολλοῦ πρὸς ὀλίγον ἢ περιττοῦ πρὸς ἄρτιον,
 ὁ δ' ὀλίγου πρὸς πολὺ ἢ ἀρτίου πρὸς περιττόν.
 εἰ οὖν πλεῖον ἔτι ἀπέχει ἀλλήλων καὶ διαφέρει τὰ
 15 συστοίχως μὲν λεγόμενα ἐν ἄλλῳ δὲ γένει τῶν ἐν
 τῷ αὐτῷ γένει (λέγω δ' οἷον τὸ γλυκὺ καὶ τὸ
 λευκὸν καλῶ σύστοιχα, γένει δ' ἕτερα· τὸ γλυκὺ
 δὲ τοῦ μέλανος πλεῖον ἔτι τῷ εἶδει διαφέρει ἢ τὸ
 λευκόν), ἔτι ἂν ἦττον ἅμα ἐνδέχοιτο αὐτὰ αἰσθά-
 268

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that is in itself, but different from that which judges white and black; each differs from itself in its method of perceiving opposites, but each acts in the same way in its method of perceiving corresponding qualities; for instance vision apprehends white in the same way as taste apprehends sweet; and as the former apprehends black, so the latter apprehends bitter.

Moreover, if the movements produced by opposite objects are opposite, and it is not possible that opposites should reside in what is the same and indivisible, and if opposites fall under one sense, such as sweet and bitter, it would not be possible to perceive these opposites simultaneously. In the same way clearly things which are not opposite cannot be simultaneously perceived; for instance some colours belong to white and some to black, and similarly other sensible objects, for instance some flavours belong to sweet and some to bitter. Nor can amalgamated objects be simultaneously perceived (for they are ratios of opposites, such as the whole octave or the fifth), unless they are perceived as one. For in this sense the ratio of extreme sounds becomes one, but in no other sense; for we shall have the ratio of many to few, and odd to even, and on the other hand few to many and even to odd. If then the objects which I call corresponding stand further apart from each other, and are more different in other classes than those in the same class (I call sweet and white corresponding, though different in class; and in specific form sweet differs from black even more than white does), it would be even less possible to perceive these (*e.g.* sweet and white) simultaneously than things belonging to the same class (*e.g.* white

Simultaneous perception of two sensibles is impossible.

448 a

νεσθαι ἢ τὰ τῷ γένει ταυτά. ὥστ' εἰ μὴ ταῦτα, οὐδ' ἐκεῖνα.

20

“Ο δὲ λέγουσί τινες τῶν περὶ τὰς συμφωνίας, ὅτι οὐχ ἅμα μὲν ἀφικνοῦνται οἱ ψόφοι, φαίνονται δέ, καὶ λανθάνει, ὅταν ὁ χρόνος ἢ ἀναίσθητος, πότερον ὀρθῶς λέγεται ἢ οὐ; τάχα γὰρ ἂν φαίη τις καὶ νῦν παρὰ τοῦτο δοκεῖν ἅμα ὁρᾶν καὶ ἀκούειν, ὅτι οἱ μεταξὺ χρόνοι λανθάνουσιν. ἢ

25

τοῦτ' οὐκ ἀληθές, οὐδ' ἐνδέχεται χρόνον εἶναι ἀναίσθητον οὐδένα οὐδὲ λανθάνειν, ἀλλὰ παντὸς ἐνδέχεται αἰσθάνεσθαι. εἰ γὰρ ὅτε αὐτὸς αὐτοῦ τις αἰσθάνεται ἢ ἄλλου ἐν συνεχεῖ χρόνῳ, μὴ

30

ἐνδέχεται τότε λανθάνειν ὅτι ἐστίν, ἔστι δέ τις ἐν τῷ συνεχεῖ καὶ τοσοῦτος ὅσος ὅλως ἀναίσθητός ἐστι, δῆλον ὅτι τότε λανθάνοι ἂν εἰ ἔστιν αὐτὸς

448 b

αὐτόν, καὶ εἰ ὁρᾷ, καὶ οὐκ αἰσθάνεται· καὶ εἰ αἰσθάνεται ἔτι, οὐκ ἂν εἶη οὔτε χρόνος οὔτε πράγμα οὐδὲν ὃ αἰσθάνεται ἢ ἐν ᾧ, εἰ μὴ οὕτως, ὅτι ἐν τούτου τινὶ ἢ ὅτι τούτου τι ὁρᾷ, εἴπερ ἔστι τι μέγεθος καὶ χρόνου καὶ πράγματος ἀν-

5

αἰσθητον ὅλως διὰ μικρότητα· εἰ γὰρ τὴν ὅλην ὁρᾷ, καὶ αἰσθάνεται τὸν αὐτὸν συνεχῶς χρόνον, οὐ τῶν νῦν τούτων τινί. ἀφηρήσθω ἡ τὸ ΓΒ, ἐν ἣ οὐκ ἦσθάνετο. οὐκοῦν ἐν ταύτης τινὶ ἢ ταύτης τι, ὥσπερ τὴν γῆν ὁρᾷ ὅλην, ὅτι τοδὶ αὐτῆς, καὶ ἐν τῷ ἐνιαυτῷ βαδίζει, ὅτι ἐν τῷδε τῷ μέρει αὐτοῦ.

10

ἀλλὰ μὴν ἐν τῷ ΒΓ οὐδὲν αἰσθάνεται. τῷ ἄρα

^a This is intended to be a *reductio ad absurdum*.

ON SENSE AND SENSIBLE OBJECTS, VII.

and black). So that if the latter is impossible, the former is certainly so.

Now for the point which some raise about concords ; they say that sounds do not arrive simultaneously, but only seem to do so, and deceive us, when the interval of time is imperceptible. Are they right or not ? One might perhaps say at once that we only suppose that we see and hear simultaneously, because the intervening time is not noticeable. Probably this is untrue, and it is impossible for any time to be imperceptible and be unnoticed, but one must be conscious of every such interval. For when a man perceives himself or anything else in continuous time, it is impossible for him to be unaware of his existence, and if again in continuous time there can be time of such short duration as to be imperceptible, it is clear that, in the case supposed, man would be unaware of his existence and, if he saw, would not be aware that he was seeing ; and, if he were aware, there would be neither time nor any object of which he was aware, except in the sense that he sees in some fraction of time, or sees some fraction of the object ; if, that is, there exists any magnitude either of time or object which is imperceptible owing to its smallness ; for if he sees a whole line and perceives the same time continuously, he does not see some fraction of this. Suppose from the whole line AB a part CB cut off, being a time in which he perceives nothing. In that case he perceives either in a fraction of time, or a fraction of the line, in the sense that he may see the whole world in that he sees part of it, or walks over it for a year, because he walks for part of a year.^a But by our assumption during the part BC he sees nothing. In that case he is said to

How this
applies to
musical
harmonies.

448 b

ἐν τούτου τινὲ τοῦ AB αἰσθάνεσθαι λέγεται τοῦ
 ὅλου αἰσθάνεσθαι καὶ τὴν ὅλην. ὁ δ' αὐτὸς λόγος
 καὶ ἐπὶ τῆς ΑΓ· αἰεὶ γὰρ ἐν τινὲ καὶ τινός, ὅλου
 δ' οὐκ ἔστιν αἰσθάνεσθαι. ἅπαντα μὲν οὖν αἰσθητά
 ἐστίν, ἀλλ' οὐ φαίνεται ὅσα ἐστίν· τοῦ γὰρ ἡλίου
 15 τὸ μέγεθος ὀρᾷ καὶ τὸ τετράπηχυ πόρρωθεν, ἀλλ'
 οὐ φαίνεται ὅσον, ἀλλ' ἐνίοτε ἀδιαίρετον, ὀρᾷ δ'
 οὐκ ἀδιαίρετον. ἡ δ' αἰτία εἴρηται ἐν τοῖς ἔμ-
 προσθεν περὶ τούτου. ὅτι μὲν οὖν οὐθεὶς ἐστι
 χρόνος ἀναίσθητος, ἐκ τούτων φανερόν.

Περὶ δὲ τῆς πρότερον λεχθείσης ἀπορίας σκε-
 πτέον, πότερον ἐνδέχεται ἅμα πλειόνων αἰσθάνεσθαι
 ἢ οὐκ ἐνδέχεται. τὸ δ' ἅμα λέγω ἐν ἐνὶ καὶ
 20 ἀτόμῳ χρόνῳ πρὸς ἄλληλα. πρῶτον μὲν οὖν ἀρ'
 ὧδ' ἐνδέχεται, ἅμα μὲν, ἐτέρῳ δὲ τῆς ψυχῆς
 αἰσθάνεσθαι, καὶ οὐ τῷ ἀτόμῳ, οὕτω δ' ἀτόμῳ
 ὥς παντὶ ὄντι συνεχεῖ; ἢ ὅτι πρῶτον μὲν τὰ
 κατὰ τὴν μίαν αἴσθησιν, οἷον λέγω ὄψιν, εἰ ἔσται
 ἄλλῳ αἰσθανομένη ἄλλου καὶ ἄλλου χρώματος,
 25 πλείω τε μέρη ἕξει εἶδει ταῦτα; καὶ γὰρ ἂ
 αἰσθάνεται, ἐν τῷ αὐτῷ γένει ἐστίν. εἰ δὲ ὅτι
 ὥς δύο ὄμματα φαίη τις, οὐδὲν κωλύει, οὕτω καὶ
 ἐν τῇ ψυχῇ, ὅτι ἴσως ἐκ μὲν τούτων ἓν τι γίνεται
 καὶ μία ἢ ἐνέργεια αὐτῶν· ἐκεῖ δέ, εἰ μὲν ἐν τὸ
 ἐξ ἀμφοῖν, ἐκεῖνο τὸ αἰσθανόμενον ἔσται, εἰ δὲ

^a Cf. 445 b 11.

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see the whole line AB in the whole time, because he sees a part of it in a part of the time. The same argument applies to the part AC ; for it will be found that one always perceives a part in a part of the time, and that one can never perceive the whole. Therefore everything can be perceived, but the magnitude does not present itself to our senses ; for instance one sees a magnitude such as that of the sun, or a four-foot rod at a distance, but one does not see what size it is ; indeed it sometimes seems an indivisible whole, but what we see is not really indivisible. The reason for this has been given in our previous words on the subject.^a It is clear then from this that there is no such thing as imperceptible time.

But in regard to the difficulty mentioned before we must consider whether it is possible or impossible to perceive more than one thing at once. By " at once " I mean in a time which is one and indivisible for different things in relation to each other. In the first place is it possible to perceive two things at once, but with a different part of the soul, that is not really in indivisible time, but only indivisible in the sense of being continuous ? Or does this imply in the first place that in one sense, for instance sight, if it shall be capable of perceiving one colour with one part and one with another, the soul will possess a number of parts specifically different ? For the objects which it perceives are in the same class. If one were to urge, that just as there are two eyes, so there is nothing to prevent there being two identical parts in the soul, we should answer that probably one unit is made up of the two eyes, and in actual operation they are one ; in that case, I mean, if one seeing organ is composed of the two, that organ will be the

A further discussion of simultaneous perception.

Has the soul separate parts?

ARISTOTLE

448 b

³⁰ χωρίς, οὐχ ὁμοίως ἔξει. ἔτι αἰσθήσεις αἱ αὐταὶ

449 a πλείους ἔσονται, ὥσπερ εἴ τις ἐπιστήμας διαφόρους φαίη· οὔτε γὰρ ἡ ἐνέργεια ἄνευ τῆς καθ' αὐτὴν ἔσται δυνάμεως, οὔτ' ἄνευ ταύτης ἔσται αἰσθησις.

Εἰ δὲ τούτων ἐν ἐνὶ καὶ ἀτόμῳ αἰσθάνεται, δῆλον ὅτι καὶ τῶν ἄλλων· μᾶλλον γὰρ ἐνεδέχεται
 5 τούτων ἅμα πλειόνων ἢ τῶν τῷ γένει ἐτέρων. εἰ δὲ δὴ ἄλλῳ μὲν γλυκέος ἄλλῳ δὲ λευκοῦ αἰσθάνεται ἢ ψυχὴ μέρος, ἥτοι τὸ ἐκ τούτων ἐν τί ἐστιν ἢ οὐχ ἔν. ἀλλ' ἀνάγκη ἔν· ἐν γάρ τι τὸ αἰσθητικὸν ἐστι μέρος. τίνος οὖν ἐκεῖνο ἐνός; οὐδὲν γὰρ ἐκ τούτων ἔν. ἀνάγκη ἄρα ἐν τι εἶναι τῆς ψυχῆς, ᾧ ἅπαντα αἰσθάνεται, καθάπερ εἴρη-
 10 ται πρότερον, ἄλλο δὲ γένος δι' ἄλλου. ἄρ' οὖν ἢ μὲν ἀδιαίρετόν ἐστι κατ' ἐνέργειαν, ἐν τί ἐστι τὸ αἰσθητικὸν γλυκέος καὶ λευκοῦ, ὅταν δὲ διαίρετόν γένηται κατ' ἐνέργειαν, ἕτερον; ἢ ὥσπερ ἐπὶ τῶν πραγμάτων αὐτῶν ἐνδέχεται, οὕτω καὶ ἐπὶ τῆς ψυχῆς. τὸ γὰρ αὐτὸ καὶ ἐν ἀριθμῷ
 15 λευκὸν καὶ γλυκὺ ἐστι, καὶ ἄλλα πολλά, εἰ μὴ χωριστὰ τὰ πάθη ἀλλήλων, ἀλλὰ τὸ εἶναι ἕτερον ἐκάστω. ὁμοίως τοίνυν θετέον καὶ ἐπὶ τῆς ψυχῆς τὸ αὐτὸ καὶ ἐν εἶναι ἀριθμῷ τὸ αἰσθητικὸν πάντων, τῷ μέντοι εἶναι ἕτερον καὶ ἕτερον τῶν μὲν γένει

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percipient, but if they act separately the case will be different. Moreover the same senses will then become plural, just as one might speak of different branches of knowledge. For no actualization can occur without each having its own potentiality, nor will there be any perception without this.

But if the soul perceives these things in one indivisible time, it is clear that it does so in all other cases ; for it would be more possible for it to perceive several of these simultaneously than things different in class. If then it is true that the soul perceives sweet with one part and white with another part, then either the result formed of these is one, or it is not. But it must be one ; for the perceptive faculty is a unit. Which one object, then, does that one faculty perceive ? For surely no one object can be composed of these. There must then be one part of the soul with which it perceives everything, as has been said before, but another, a different one, through which it perceives different objects. In so far, then, as it is indivisible in operation, there must be some one faculty perceptive of sweet and white, but, when in actual operation it is divisible, the faculties are different. As this is possible in objects of sense the same thing can be true of the soul. For the same thing which is numerically one may be both white and sweet and have many other qualities as well, if the attributes are not separated from each other, but their essential existence is different in each case. So we must suppose the same thing to be true of the soul, and that the faculty which perceives everything is one and the same numerically, but that its essential existence is different in perceiving things different sometimes in genus and sometimes in species. So

This theory
is unsound.

449 a

τῶν δὲ εἶδει. ὥστε καὶ αἰσθάνοιτ' ἂν ἅμα τῷ
 20 αὐτῷ καὶ ἐνί, λόγῳ δ' οὐ τῷ αὐτῷ.

Ὅτι δὲ τὸ αἰσθητὸν πᾶν ἐστὶ μέγεθος καὶ οὐκ
 ἔστιν ἀδιαίρετον αἰσθητόν, δηλόν. ἔστι γὰρ ὅθεν
 μὲν οὐκ ἂν ὀφθείη, ἄπειρον τὸ ἀπόστημα, ὅθεν
 δὲ ὁράται, πεπερασμένον. ὁμοίως δὲ καὶ τὸ
 ὁσφραντὸν καὶ ἀκουστὸν καὶ ὅσων μὴ αὐτῶν ἀπτό-
 25 μενοι αἰσθάνονται. ἔστι δέ τι ἔσχατον τοῦ ἀποστή-
 ματος ὅθεν οὐχ ὁράται, καὶ πρῶτον ὅθεν ὁράται.
 τοῦτο δὴ ἀνάγκη ἀδιαίρετον εἶναι, οὐ ἐν μὲν τῷ
 ἐπέκεινα οὐκ ἐνδέχεται αἰσθάνεσθαι ὄντος, ἐν δὲ
 τῷ ἐπὶ ταδὶ ἀνάγκη αἰσθάνεσθαι. εἰ δὴ τί ἐστιν
 ἀδιαίρετον αἰσθητόν, ὅταν τεθῇ ἐπὶ τῷ ἐσχάτῳ
 80 ὅθεν ἐστὶν ὕστατον μὲν οὐκ αἰσθητὸν πρῶτον δ'
 αἰσθητόν, ἅμα συμβήσεται ὁρατὸν εἶναι καὶ ἀόρατον.
 τοῦτο δ' ἀδύνατον.

449 b

Περὶ μὲν οὖν τῶν αἰσθητηρίων καὶ τῶν αἰσθητῶν
 τίνα τρόπον ἔχει καὶ κοινῇ καὶ καθ' ἕκαστον
 αἰσθητήριον εἴρηται· τῶν δὲ λοιπῶν πρῶτον
 σκεπτέον περὶ μνήμης καὶ τοῦ μνημονεύειν.

^a The modern definition of a point, which "has no magnitude," really solves Aristotle's difficulty; for no sensible

ON SENSE AND SENSIBLE OBJECTS, VII.

that it would always perceive with one and the same part, but theoretically not the same.

It is of course clear that every sensible object is a magnitude, and that no sensible object is indivisible. The distance at which an object cannot be seen is infinite, but the interval over which it can be seen is limited. This is also true of the object of smell and hearing, and all the other objects which we perceive without contact. But there is an extreme point of the interval at which it is not seen, and a first point at which it is seen. This point must necessarily be indivisible, the point beyond which it is impossible to see anything, and within which one must be able to see it. If, then, any sensible object is indivisible, when it is placed at the limiting point, that is the last point at which it cannot be seen and the first at which it can be seen, it will be both visible and invisible at the same time ; which is impossible.^a

Concerning the sense organs and objects of sense, their character in general and in relation to each sense organ, we have concluded our discussion. Of the remaining subjects we must first consider memory and remembering.

object, which by implication has magnitude, can be "placed at a point."

Every
sensible
object is a
magnitude.

ON MEMORY AND
RECOLLECTION

INTRODUCTION

THIS short treatise is perhaps of higher value than the preceding. In places its obscurity has been made worse by errors in the manuscripts, and some passages are not satisfactorily elucidated. But it contains some noteworthy ideas. The distinction drawn between memory and recollection is on the whole valid, and from it follows directly the assertion that, whereas memory is shared by all the animal kingdom, recollection is the exclusive prerogative of man. In the second chapter Aristotle outlines what we call the Association of Ideas, and, although it is in his description of the process by which recollection recovers the past that the greatest obscurity prevails, it is clear that his general theory of that process is very near to modern views on the subject.

ΠΕΡΙ ΜΝΗΜΗΣ ΚΑΙ ΑΝΑΜΝΗΣΕΩΣ

449 b

Ι. Περὶ μνήμης καὶ τοῦ μνημονεύειν λεκτέον
5 τί ἐστι, καὶ διὰ τίν' αἰτίαν γίνεται, καὶ τίνι τῶν
τῆς ψυχῆς μορίων συμβαίνει τοῦτο τὸ πάθος καὶ
τὸ ἀναμνησέσθαι· οὐ γὰρ οἱ αὐτοὶ εἰσι μνημο-
νικοὶ καὶ ἀναμνηστικοί, ἀλλ' ὥς ἐπὶ τὸ πολὺ
μνημονικώτεροι μὲν οἱ βραδεῖς, ἀναμνηστικώτεροι
δὲ οἱ ταχεῖς καὶ εὐμαθεῖς.

Πρῶτον μὲν οὖν ληπτέον ποῖά ἐστι τὰ μνημο-
10 νευτά· πολλάκις γὰρ ἕξαπατᾷ τοῦτο. οὔτε γὰρ
τὸ μέλλον ἐνδέχεται μνημονεύειν, ἀλλ' ἔστι δοξα-
στόν καὶ ἐλπιστόν (εἴη δ' ἂν καὶ ἐπιστήμη τις
ἐλπιστική, καθάπερ τινές φασι τὴν μαντικήν),
οὔτε τοῦ παρόντος, ἀλλ' αἰσθησις· ταύτη γὰρ οὔτε
τὸ μέλλον οὔτε τὸ γενόμενον γνωρίζομεν, ἀλλὰ τὸ
15 παρὸν μόνον. ἡ δὲ μνήμη τοῦ γενομένου· τὸ δὲ
παρὸν ὅτε πάρεστιν, οἷον τοδὶ τὸ λευκὸν ὅτε ὄρᾳ,
οὐδεὶς ἂν φαίη μνημονεύειν, οὐδὲ τὸ θεωρούμενον,
ὅτε θεωρῶν τυγχάνει καὶ ἐννοῶν· ἀλλὰ τὸ μὲν
αἰσθάνεσθαι φησι, τὸ δ' ἐπίστασθαι μόνον· ὅταν

ON MEMORY AND RECOLLECTION

I. Our task is now to discuss memory and remembering : what it is, why it occurs and to what part of the soul this affection and that of recollection belongs. Men who have good memories are not the same as those who are good at recollecting, in fact generally speaking the slow-witted have better memories, but the quick-witted and those who learn easily are better at recollecting.

Now our first subject for consideration is the nature of things remembered ; for this is a frequent source of error. It is impossible to remember the future ; that is expecting or hoping. (There might perhaps be a science of expectation as some say there is of prophecy.) Nor has it to do with the present : this is perception ; for we do not have knowledge either of the future or the past by perception, but only of the present. Memory then is of the past ; no one could claim to remember the present while it is present. For instance one cannot remember a particular white object while one is looking at it, nor can one remember a subject of theoretical speculation while one happens to be speculating and thinking about it. The former one claims to perceive and the latter merely to know.

What can
be remem-
bered ?

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δ' ἄνευ τῶν ἐνεργειῶν ἔχῃ τὴν ἐπιστήμην καὶ
 20 τὴν αἰσθησιν, οὕτω μέμνηται τὰς τοῦ τριγώνου
 ὅτι δύο ὀρθαῖς ἴσαι, τὸ μὲν ὅτι ἔμαθεν ἢ ἐθεώρησεν,
 τὸ δὲ ὅτι ἤκουσεν ἢ εἶδεν ἢ ὅ τι τοιοῦτον· ἀεὶ
 γὰρ ὅταν ἐνεργῇ κατὰ τὸ μνημονεύειν, οὕτως ἐν
 τῇ ψυχῇ λέγει, ὅτι πρότερον τοῦτο ἤκουσεν ἢ
 ᾗσθητο ἢ ἐνόησεν.

Ἔστι μὲν οὖν ἡ μνήμη οὔτε αἰσθησις οὔτε
 25 ὑπόληψις, ἀλλὰ τούτων τινὸς ἕξις ἢ πάθος, ὅταν
 γένηται χρόνος. τοῦ δὲ νῦν ἐν τῷ νῦν οὐκ ἔστι
 μνήμη, καθάπερ εἴρηται καὶ πρότερον, ἀλλὰ τοῦ
 μὲν παρόντος αἰσθησις, τοῦ δὲ μέλλοντος ἐλπίς,
 τοῦ δὲ γενομένου μνήμη. διὸ μετὰ χρόνου πᾶσα
 μνήμη. ὥσθ' ὅσα χρόνου αἰσθάνεται, ταῦτα μόνα
 30 τῶν ζώων μνημονεύει, καὶ τούτῳ ᾧ αἰσθάνεται.

Ἐπεὶ δὲ περὶ φαντασίας εἴρηται πρότερον ἐν
 τοῖς περὶ ψυχῆς, καὶ νοεῖν οὐκ ἔστιν ἄνευ φαν-
 450 α τάσματος· συμβαίνει γὰρ τὸ αὐτὸ πάθος ἐν τῷ
 νοεῖν ὅπερ καὶ ἐν τῷ διαγράφειν· ἐκεῖ τε γὰρ οὐθὲν
 προσχρώμενοι τῷ τὸ ποσὸν ὠρισμένον εἶναι τὸ
 τριγώνου, ὅμως γράφομεν ὠρισμένον κατὰ τὸ
 ποσόν· καὶ ὁ νοῶν ὡσαύτως, καὶ μὴ ποσὸν νοῇ,
 τίθεται πρὸ ὁμμάτων ποσόν, νοεῖ δ' οὐχ ἢ ποσόν.
 5 αὖ δ' ἡ φύσις ἢ τῶν ποσῶν, ἀόριστον δέ, τίθεται
 μὲν ποσὸν ὠρισμένον, νοεῖ δ' ἢ ποσὸν μόνον. διὰ
 τίνα μὲν οὖν αἰτίαν οὐκ ἐνδέχεται νοεῖν οὐδὲν ἄνευ
 τοῦ συνεχοῦς, οὐδ' ἄνευ χρόνου τὰ μὴ ἐν χρόνῳ

^a De An. iii. 7, etc.

ON MEMORY AND RECOLLECTION, I.

ledge or sensation without the exercise of these activities, then one remembers: for instance one knows that the angles of a triangle are together equal to two right angles, a fact which one has learned or thought out, or one feels something which one has heard or seen or something of the kind; for when a man is exerting his memory he always says in his mind that he has heard, or felt, or thought this before.

Memory, then, is neither sensation nor supposition, but is a condition or attribute of one of these, when time has elapsed. There can be no memory of something now present at the present time, as has been said, but sensation refers to what is present, expectation to what is future, and memory to what is past. All memory, then, implies lapse of time. So that only those living creatures which are conscious of time can be said to remember, and they do so with that part which is conscious of time.

As has been said before in my treatise *On the Soul*^a about imagination, it is impossible even to think without a mental picture. The same process occurs in thinking as in drawing a diagram; for in this case although we make no use of the fact that the magnitude of a triangle is a finite quantity, yet we draw it as having a finite magnitude. In the same way the man who is thinking, though he may not be thinking of a finite magnitude, still puts a finite magnitude before his eyes, though he does not think of it as such. And even if its nature is that of a magnitude, but an unlimited one, he still puts before him a finite magnitude, but thinks of it as a magnitude without limit. The reason why it is impossible to think of anything without continuity, or to think of things which have no time except in terms of time,

What is memory?

The part played by imagination.

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ὄντα, ἄλλος λόγος. μέγεθος δ' ἀναγκαῖον γνωρί-
 10 ζειν καὶ κίνησιν ᾧ καὶ χρόνον, καὶ τὸ φάντασμα
 τῆς κοινῆς αἰσθήσεως πάθος ἐστίν. ὥστε φανερόν
 ὅτι τῷ πρώτῳ αἰσθητικῷ τούτων ἡ γνῶσις ἐστίν.
 ἡ δὲ μνήμη καὶ ἡ τῶν νοητῶν οὐκ ἄνευ φαν-
 τάσματός ἐστιν. ὥστε τοῦ νοουμένου κατὰ συμ-
 βεβηκὸς ἂν εἴη, καθ' αὐτὸ δὲ τοῦ πρώτου αἰσθη-
 15 τικοῦ. διὸ καὶ ἑτέροις τισὶν ὑπάρχει τῶν ζώων,
 καὶ οὐ μόνον ἀνθρώποις καὶ τοῖς ἔχουσι δόξαν ἢ
 φρόνησιν. εἰ δὲ τῶν νοητικῶν τι μορίων ᾗν, οὐκ
 ἂν ὑπῆρχε πολλοῖς τῶν ἄλλων ζώων, ἴσως δ'
 οὐδενὶ τῶν θνητῶν, ἐπεὶ οὐδὲ νῦν πᾶσι διὰ τὸ μὴ
 πάντα χρόνου αἰσθησιν ἔχειν· ἀεὶ γὰρ ὅταν ἐνεργῇ
 20 τῇ μνήμῃ, καθάπερ καὶ πρότερον εἶπομεν, ὅτι εἶδε
 τοῦτο ἢ ἤκουσεν ἢ ἔμαθε, προσαισθάνεται ὅτι
 πρότερον· τὸ δὲ πρότερον καὶ ὕστερον ἐν χρόνῳ
 ἐστίν.

Τίνος μὲν οὖν τῶν τῆς ψυχῆς ἐστὶν ἡ μνήμη,
 φανερόν, ὅτι οὐπὲρ καὶ ἡ φαντασία· καὶ ἔστι
 μνημονευτὰ καθ' αὐτὰ μὲν ὅσα ἐστὶ φανταστά,
 25 κατὰ συμβεβηκὸς δὲ ὅσα μὴ ἄνευ φαντασίας.
 ἀπορήσειε δ' ἂν τις πῶς ποτὲ τοῦ μὲν πάθους
 παρόντος τοῦ δὲ πράγματος ἀπόντος μνημονεύεται
 τὸ μὴ παρόν. δῆλον γὰρ ὅτι δεῖ νοῆσαι τοιοῦτον
 τὸ γινόμενον διὰ τῆς αἰσθήσεως ἐν τῇ ψυχῇ καὶ
 τῷ μορίῳ τοῦ σώματος τῷ ἔχοντι αὐτήν, οἷον
 30 ζωγράφημα τι τὸ πάθος, οὐ φαμέν τὴν ἔξω μνήμην

ON MEMORY AND RECOLLECTION, I.

is another question. But it is essential to think of size and motion in terms of time, and the mental picture is an affection of the general sense. So that it is clear that the knowledge of these things belongs to the first perceptive faculty. But memory and the knowledge of things thought cannot exist without a mental picture. So that they would seem to belong incidentally to the thinking faculty, but in themselves to the first sense perception. This is why memory exists in some animals, and not exclusively in man and those who are capable of opinion and thought. But if memory belonged purely to the intellectual faculty, it would not exist, as it does, in many other animals; perhaps it would not exist even in any human being, since even as it is it does not occur in all because they have not all a consciousness of time; for, as we said before, whenever a man exercises his memory, to recall that he has seen, heard or learned something, he always has the additional consciousness that he has heard it before; now "before" and "after" relate to time.

It is, then, obvious that memory refers to that part of the soul to which imagination refers; all things which are mental pictures are in themselves subjects of memory, and those which cannot exist apart from imagination are only incidentally subjects of memory. A difficulty may arise as to how one can remember something which is not present; that is, the affection of the mind being present, but its object absent. For it is obvious that one must consider such a thing which occurs in the soul by means of the sense perception, and in that part of the body which contains the soul, as a kind of painted portrait—an affection, the lasting state of which we describe as memory; for the move-

Memory and
imagina-
tion.

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εἶναι· ἡ γὰρ γινομένη κίνησις ἐνσημαίνεται οἶον
τύπον τινὰ τοῦ αἰσθήματος, καθάπερ οἱ σφραγιζό-

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μενοι τοῖς δακτυλίοις. διὸ καὶ τοῖς μὲν ἐν κινήσει
πολλῇ διὰ πάθος ἢ δι' ἡλικίαν οὖσιν οὐ γίνεται
μνήμη, καθάπερ ἂν εἰς ὕδωρ ῥέον ἐμπιπτούσης
τῆς κινήσεως καὶ τῆς σφραγίδος· τοῖς δὲ διὰ τὸ
ψήχεσθαι, καθάπερ τὰ παλαιὰ τῶν οἰκοδομημάτων,
καὶ διὰ σκληρότητα τοῦ δεχομένου τὸ πάθος οὐκ
ἐγγίνεται ὁ τύπος. διόπερ οἷ τε σφόδρα νέοι καὶ
οἱ γέροντες ἀμνήμονές εἰσιν· ῥέουσι γὰρ οἱ μὲν
διὰ τὴν αὔξησιν, οἱ δὲ διὰ τὴν φθίσιν. ὁμοίως
δὲ καὶ οἱ λίαν ταχεῖς καὶ οἱ λίαν βραδεῖς οὐδέτεροι
φαίνονται μνήμονες· οἱ μὲν γὰρ εἰσιν ὑγρότεροι τοῦ
δέοντος, οἱ δὲ σκληρότεροι· τοῖς μὲν οὖν οὐ μένει
τὸ φάντασμα ἐν τῇ ψυχῇ, τῶν δ' οὐχ ἄπτεται.

Ἄλλ' εἰ δὴ τοιοῦτόν ἐστι τὸ συμβαῖνον περὶ
τὴν μνήμην, πότερον τοῦτο μνημονεύει τὸ πάθος,
ἢ ἐκείνο ἀφ' οὗ ἐγένετο; εἰ μὲν γὰρ τοῦτο, τῶν
ἀπόντων οὐδὲν ἂν μνημονεύοιμεν· εἰ δ' ἐκείνο,
πῶς αἰσθανόμενοι τούτου μνημονεύομεν, οὐ μὴ
αἰσθανόμεθα, τὸ ἀπόν; εἴ τ' ἐστὶν ὁμοιον ὥσπερ
τύπος ἢ γραφὴ ἐν ἡμῖν, τούτου αὐτοῦ ἢ αἰσθησις
διὰ τί ἂν εἴη μνήμη ἑτέρου, ἀλλ' οὐκ αὐτοῦ
τούτου; ὁ γὰρ ἐνεργῶν τῇ μνήμῃ θεωρεῖ τὸ πάθος
τούτο καὶ αἰσθάνεται τούτου. πῶς οὖν τὸ μὴ παρὸν
μνημονεύει; εἴη γὰρ ἂν καὶ ὄραν τὸ μὴ παρὸν
καὶ ἀκούειν. ἢ ἔστιν ὥς ἐνδέχεται καὶ συμβαίνει
τούτο; οἶον γὰρ τὸ ἐν τῷ πίνακι γεγραμμένον
καὶ ζῶόν ἐστι καὶ εἰκῶν, καὶ τὸ αὐτὸ καὶ ἐν
τοῦτ' ἐστὶν ἄμφω, τὸ μέντοι εἶναι οὐ ταυτὸν ἀμ-

ON MEMORY AND RECOLLECTION, I.

ment produced implies some impression of sense movement, just as when men seal with signet rings. For this reason some men in the presence of considerable stimulus have no memory owing to disease or age, just as if a stimulus or a seal were impressed on flowing water. With them the design makes no impression because they are worn down, like old walls in buildings, or because of the hardness of that which is to receive the impression. For this reason the very young and the old have poor memories ; they are in a state of flux, the young because of their growth, the old because of their decay. For a similar reason neither the very quick nor the very slow appear to have good memories ; the former are moister than they should be, and the latter harder ; with the former the picture has no permanence, with the latter it makes no impression.

If this is a true picture of what occurs with memory, ^{What does one actually remember?} is what one remembers the present effect, or the original from which it arose ? If the former, then we could not remember anything in its absence ; if the latter, how can we remember by perceiving that which we do not perceive—the absent ? If the effect on us is the same as with an impression or a painting, why is the perception of this memory of something else and not of itself ? For the man while exercising his memory considers and perceives this affection. How, then, does he remember that which is not present ? For this would imply that it is possible to see and hear what is not present. Surely this is both possible and does actually occur. For just as the portrait painted on the panel is both a picture and a portrait, and both these are one and the same thing, yet the actual existence of the two is not the same thing, and it is

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φοῖν, καὶ ἔστι θεωρεῖν καὶ ὡς ζῶον καὶ ὡς εἰκόνα,
οὕτω καὶ τὸ ἐν ἡμῖν φάντασμα δεῖ ὑπολαβεῖν καὶ
25 αὐτό τι καθ' αὐτὸ εἶναι θεώρημα καὶ ἄλλου φάν-
τασμα. ἥ μὲν οὖν καθ' αὐτό, θεώρημα ἢ φάντασμά
ἐστίν, ἥ δ' ἄλλου, οἷον εἰκὼν καὶ μνημόνευμα.
ὥστε καὶ ὅταν ἐνεργῇ ἡ κίνησις αὐτοῦ, ἂν μὲν, ἥ
καθ' αὐτό ἐστι, ταύτῃ αἰσθηται ἡ ψυχὴ αὐτοῦ,
οἷον νόημά τι ἢ φάντασμα φαίνεται ἐπελθεῖν· ἂν
30 δ' ἥ ἄλλου, ὥσπερ ἐν τῇ γραφῇ ὡς εἰκόνα θεωρεῖ,
καὶ μὴ ἑωρακῶς τὸν Κορίσκον ὡς Κορίσκου·
ἐνταῦθά τε ἄλλο τὸ πάθος τῆς θεωρίας ταύτης καὶ
451 a ὅταν ὡς ζῶον γεγραμμένον θεωρῇ, ἔν τε τῇ ψυχῇ
τὸ μὲν γίνεται ὥσπερ νόημα μόνον, τὸ δ' ὡς ἐκεῖ
ὅτι εἰκὼν, μνημόνευμα. καὶ διὰ τοῦτο ἐνίοτ' οὐκ
ἴσμεν, ἐγγινομένων ἡμῖν ἐν τῇ ψυχῇ τοιούτων
κινήσεων ἀπὸ τοῦ αἰσθέσθαι πρότερον, εἰ κατὰ
τὸ ἡσθῆσθαι συμβαίνει, καὶ εἰ ἔστι μνήμη ἢ οὐ
5 διστάζομεν· ὅτε δὲ συμβαίνει ἐννοῆσαι καὶ ἀνα-
μνησθῆναι ὅτι ἠκούσαμεν τι πρότερον ἢ εἶδομεν.
τοῦτο δὲ συμβαίνει, ὅταν θεωρῶν ὡς αὐτὸ μετα-
βάλλῃ καὶ θεωρῇ ὡς ἄλλου. γίνεται δὲ καὶ
τοῦναντίον, οἷον συνέβη Ἀντιφέροντι τῷ Ὠρεῖτῃ
10 καὶ ἄλλοις ἐξισταμένοις· τὰ γὰρ φαντάσματα
ἔλεγον ὡς γενόμενα καὶ ὡς μνημονεύοντες. τοῦτο
δὲ γίνεται, ὅταν τις τὴν μὴ εἰκόνα ὡς εἰκόνα
θεωρῇ. αἱ δὲ μελέται τὴν μνήμην σώζουσι τῷ

ON MEMORY AND RECOLLECTION, I.

possible to think of it both as a living original and as a portrait, so in the same way we must regard the mental picture within us both as a thing for consideration in itself and as a mental picture of something else. In so far as we consider it in itself, it is a subject of consideration or a mental picture, but in so far as we consider it as a portrait of something else, we are thinking of it as an image and an object of memory. So that when the stimulus is operative, if it is considered in itself, the soul perceives it in this way, and it appears as a subject of thought, or a mental picture ; but if it is considered as a portrait of another, just as one regards a figure in a picture as a portrait, and though one does not see Coriscus, one looks at it as a portrait of Coriscus. In the latter case the feeling aroused by looking at it in this way is not the same as when one considers it as a painted picture ; the former exists in the soul merely as an object of thought, but the latter, inasmuch as it is there a picture, is a subject of memory. And for this reason sometimes we do not know, when such stimuli in our soul originally arise from sense perception, whether it occurs because we have perceived, and we are in doubt whether it is memory or not. But sometimes it happens that we reflect and remember that we have heard or seen this something before. Now this occurs whenever we first think of it as itself, and then change and think of it as referring to something else. The opposite also occurs, as happened to Antipheron of Oreus, and other lunatics ; for they spoke of their mental pictures as if they had actually taken place, and as if they actually remembered them. Now this happens when one regards as a portrait what is not a portrait ; but practice preserves

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ἐπαναμιμνήσκειν· τοῦτο δ' ἐστὶν οὐδὲν ἕτερον ἢ τὸ θεωρεῖν πολλάκις ὡς εἰκόνα καὶ μὴ ὡς καθ' αὐτό.

- 15 Τί μὲν οὖν ἐστὶ μνήμη καὶ τὸ μνημονεύειν, εἴρηται, ὅτι φαιτάσματος, ὡς εἰκότος οὐ φάντασμα, ἕξις, καὶ τίνος μορίου τῶν ἐν ἡμῖν, ὅτι τοῦ πρώτου αἰσθητικοῦ, καὶ ᾧ χρόνου αἰσθανόμεθα.

- II. Περὶ δὲ τοῦ ἀναμιμνήσκεσθαι λοιπὸν εἰπεῖν. πρῶτον μὲν οὖν ὅσα ἐν τοῖς ἐπιχειρηματικοῖς
 20 λόγοις ἐστὶν ἀληθῆ, δεῖ τίθεσθαι ὡς ὑπάρχοντα. οὔτε γὰρ μνήμης ἐστὶν ἀνάληψις ἢ ἀνάμνησις οὔτε λήψις· ὅταν γὰρ τὸ πρῶτον ἢ μάθῃ ἢ πάθῃ, οὐτ' ἀναλαμβάνει μνήμην οὐδεμίαν (οὐδεμία γὰρ προ- γέγονεν) οὐτ' ἐξ ἀρχῆς λαμβάνει· ὅταν δὲ ἐγγένηται ἢ ἕξις καὶ τὸ πάθος, τότε ἡ μνήμη ἐστίν. ὥστε
 25 μετὰ τοῦ πάθους ἐγγινομένου οὐκ ἐγγίνεται. ἔτι δ' ὅτε τὸ πρῶτον ἐγγέγονε τῷ ἀτόμῳ καὶ ἐσχάτῳ, τὸ μὲν πάθος ἐνυπάρχει ἤδη τῷ παθόντι καὶ ἡ ἐπιστήμη, εἰ δεῖ καλεῖν ἐπιστήμην τὴν ἕξιν ἢ τὸ πάθος (οὐθὲν δὲ κωλύει κατὰ συμβεβηκὸς καὶ μνημονεύειν ἕνια ὧν ἐπιστάμεθα)· τὸ δὲ μνημονεύειν
 80 καθ' αὐτὸ οὐχ ὑπάρχει πρὶν χρονισθῆναι· μνημο- νεύει γὰρ νῦν ὃ εἶδεν ἢ ἔπαθε πρότερον, οὐχ ὃ νῦν ἔπαθε, νῦν μνημονεύει. ἔτι δὲ φανερόν ὅτι μνη-
 451 b μνημονεύειν ἐστὶ μὴ νῦν ἀναμνησθέντα, ἀλλ' ἐξ ἀρχῆς

^a This does not appear to refer to any extant treatise.

^b A. here rejects Plato's identification of "learning" with "recollection."

ON MEMORY AND RECOLLECTION, I.—II.

the memory by the process of recollection. This is nothing but the repeated contemplation of an object as an image, and not as existent in itself.

We have then explained what memory and remembering is, that it is a condition of mental picture, as of a portrait of which it is the mental picture, and to what part of us it belongs, that it belongs to primary sensation, and to that part with which we are conscious of time.

II. It remains to speak about recollecting. But first of all what has been said in our dialectical treatise ^a is true, and must be regarded as proved. For recollection is neither the recovery nor the acquisition of memory ; for when one first learns or receives a sense impression, one does not recover any memory ^b (for none has gone before), nor does one acquire memory from this first impression ; but when the condition (*i.e.* the learning) or the affection (*i.e.* the sense impression) has already been received, then there is memory ; so that memory does not arise at the same time as the reception of the affection. Moreover, at the time when memory exists for the first time in the indivisible and ultimate sense organ, the affection already exists in the affected, and so does the knowledge, if one can call the state or the affection knowledge (for there is nothing to prevent our remembering incidentally some of the things we know) ; but memory in itself does not arise until time has elapsed ; for one remembers in the present what one saw or suffered in the past ; one does not remember in the present what one experiences in the present. Moreover it is evident that it is possible to remember things which are not recalled at the moment, but which one has perceived or suffered all

Recollection
and
Memory.

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αἰσθόμενον ἢ παθόντα. ἀλλ' ὅταν ἀναλαμβάνῃ ἢν
 πρότερον εἶχεν ἐπιστήμην ἢ αἴσθησιν ἢ οὐ ποτέ τὴν
 ἕξιν ἐλέγομεν μνήμην, τοῦτ' ἐστὶ καὶ τότε τὸ
 5 ἀναμνησέσθαι τῶν εἰρημένων τι. τὸ δὲ μνη-
 μονεύειν συμβαίνει, καὶ μνήμη ἀκολουθεῖ. οὐδὲ δὴ
 ταῦτα ἀπλῶς, ἐὰν ἔμπροσθεν ὑπάρξαντα πάλιν
 ἐγγένηται, ἀλλ' ἔστιν ὡς, ἔστι δ' ὡς οὐ. δις γὰρ
 μαθεῖν καὶ εὐρεῖν ἐνδέχεται τὸν αὐτὸν τὸ αὐτό.
 δεῖ οὖν διαφέρειν τὸ ἀναμνησέσθαι τούτων, καὶ
 10 ἐνούσης πλείονος ἀρχῆς ἢ ἐξ ἧς μανθάνουσιν
 ἀναμνησέσθαι.

Συμβαίνουνσι δ' αἱ ἀναμνήσεις, ἐπειδὴ πέφυκεν
 ἡ κίνησις ἥδε γενέσθαι μετὰ τήνδε· εἰ μὲν ἐξ
 ἀνάγκης, δῆλον ὡς ὅταν ἐκείνη κινηθῇ, τήνδε κινη-
 θήσεται· εἰ δὲ μὴ ἐξ ἀνάγκης ἀλλ' ἔθει, ὡς ἐπὶ
 τὸ πολὺ κινηθήσεται. συμβαίνει δ' ἐνίοις ἅπαξ
 15 ἐθισθῆναι μᾶλλον ἢ ἄλλους πολλάκις κινουμένους·
 διὸ ἓνια ἅπαξ ἰδόντες μᾶλλον μνημονεύομεν ἢ
 ἕτερα πολλάκις. ὅταν οὖν ἀναμνησκώμεθα,
 κινούμεθα τῶν προτέρων τινὰ κινήσεων, ἕως ἂν
 κινηθῶμεν μεθ' ἣν ἐκείνη εἴωθεν. διὸ καὶ τὸ
 ἐφεξῆς θηρεύομεν νοήσαντες ἀπὸ τοῦ νῦν ἢ ἄλλου
 20 τινός, καὶ ἀφ' ὁμοίου ἢ ἐναντίου ἢ τοῦ σύνεγγυς.
 διὰ τοῦτο γίνεται ἡ ἀνάμνησις· αἱ γὰρ κινήσεις
 τούτων τῶν μὲν αἱ αὐταί, τῶν δ' ἅμα, τῶν δὲ

^a i.e. although memory does not imply recollection.

ON MEMORY AND RECOLLECTION, II.

along. But when one recovers knowledge or sensation which one had before, or recovers that the condition of which we have previously called memory, at that moment this may be called recollection, and is followed by the things we have mentioned. Yet "the process of recollection implies memory, and is followed by memory. Nor is it true merely to say that things previously existing arise again, but in one sense this is true, in another not. For it is possible for the same man to learn and discover the same thing twice; now recollection must differ from this, and to remember must imply some impulse beyond that from which they learn in the first instance.

Acts of recollection occur when one impulse naturally succeeds another: now if this order occurs of necessity, it is plain that when one impulse is produced the next will be produced also; but if the order is not inevitable, but only usual, the second movement will normally follow. But it happens that with some persons the habit is more effectively formed from one impulse than with others, from receiving the impulse many times; and so we have a better recollection of some things, that we have seen once, than of others, that we have seen many times. When, then, we recollect, we are moved by one of our former impulses, until at last we are moved by that after which this impulse usually occurs. This is why, starting in thought from a present incident, we follow the trail in order, beginning from something similar, or contrary, or closely connected. In this way recollection arises; for the impulses of these starting-points are sometimes identical with what we seek, sometimes occurred simultaneously, and sometimes actually

The process
of recollec-
tion.

451 b

μέρος ἔχουσιν, ὥστε τὸ λοιπὸν μικρὸν ὃ ἐκινήθη μετ' ἐκείνο.

Ζητοῦσι μὲν οὖν οὕτω, καὶ μὴ ζητοῦντες δ' οὕτως ἀναμιμνήσκονται, ὅταν μεθ' ἑτέραν κίνησιν
 25 ἐκείνη γένηται· ὥς δὲ τὰ πολλὰ ἐτέρων γενομένων κινήσεων οἷων εἵπομεν, ἐγένετο ἐκείνη. οὐδὲν δὲ δεῖ σκοπεῖν τὰ πόρρω, πῶς μεμνήμεθα, ἀλλὰ τὰ σύνεγγυς· δηλὸν γὰρ ὅτι ὁ αὐτός ἐστι τρόπος, λέγω δὲ τὸ ἐφεξῆς, οὐ προζητήσας οὐδ' ἀναμνησθεῖς. τῷ γὰρ ἔθει ἀκολουθοῦσιν αἱ κινήσεις ἀλλή-
 80 λαις, ἥδε μετὰ τήνδε. καὶ ὅταν τοίνυν ἀναμιμνήσκεσθαι βούληται, τοῦτο ποιήσει· ζητήσει λαβεῖν ἀρχὴν κινήσεως, μεθ' ἣν ἐκείνη ἔσται. διὸ τάχιστα
 452 a καὶ κάλλιστα γίνονται ἀπ' ἀρχῆς αἱ ἀναμνήσεις· ὥς γὰρ ἔχουσι τὰ πράγματα πρὸς ἄλληλα τῷ ἐφεξῆς, οὕτω καὶ αἱ κινήσεις. καὶ ἔστιν εὐμνημόνευτα ὅσα τάξιν τινὰ ἔχει, ὥσπερ τὰ μαθήματα· τὰ δὲ φαῦλα¹ χαλεπῶς. καὶ τούτῳ διαφέρει τὸ
 5 ἀναμιμνήσκεσθαι τοῦ πάλιν μανθάνειν, ὅτι δυνήσεται πῶς δι' αὐτοῦ κινήσῃ ἐπὶ τὸ μετὰ τὴν ἀρχήν. ὅταν δὲ μή, ἀλλὰ δι' ἄλλου, οὐκέτι μέμνηται.

Πολλάκις δ' ἤδη μὲν ἀδυνατεῖ ἀναμνησθῆναι, ζητεῖν δὲ δύναται καὶ εὐρίσκει. τοῦτο δὲ γίνεται κινοῦντι πολλά, ἕως ἂν τοιαύτην κινήσῃ κίνησιν ἥ

¹ φαύλως καὶ B.

ON MEMORY AND RECOLLECTION, II.

form a part of what we seek, so that the portion which was stimulated after that is only a small one.

This is the way in which men seek to evoke recol-^{The method.}lection, and the way in which they recollect, even if they do not try to, when one impulse occurs after another ; but generally speaking it is when other impulses, such as we have mentioned, have been aroused that the particular impulse arises. There is no need to consider how we remember far off events, but we may confine ourselves to near ones ; for it is clear that the method is the same in both cases, I mean by a chain of succession, without previous search or recollection. For the impulses follow each other by custom, one after another. When a man wishes to recall anything, this will be his method ; he will try to find a starting-point for the impulse, after which the one he seeks will appear. This is why recollections which have a beginning to start from are always achieved soonest and most successfully ; for just as the objects are related to each other in an order of succession, so are the impulses. Those subjects which possess an orderly arrangement are the easiest to remember, like mathematical problems ; others are inferior and are recovered with difficulty. It is in this that the difference between recollecting and learning afresh lies, that he will be able in some way to move on by his own effort to what succeeds the starting-point. But when this is impossible, and it can only proceed through another agency, there is no memory.

It often happens that a man cannot recall at the moment, but can search for what he wants and find it. ^{Why it may fail.} This occurs when a man initiates many impulses, until at last he initiates that which the object of his

452 a

10 ἀκολουθήσει τὸ πρᾶγμα. τὸ γὰρ μεμνησθαί ἐστι τὸ
 ἐνεῖναι δυνάμει τὴν κινουσαν· τοῦτο δέ, ὥστ' ἐξ
 αὐτοῦ καὶ ὧν ἔχει κινήσεων κινήθῃναι, ὥσπερ
 εἴρηται. δεῖ δὲ λαβέσθαι ἀρχῆς. διὸ ἀπὸ τόπων
 δοκοῦσιν ἀναμνησκέσθαι ἐνίοτε. τὸ δ' αἴτιον ὅτι
 ταχὺ ἀπ' ἄλλου ἐπ' ἄλλο ἔρχονται, οἷον ἀπὸ γάλα-
 κτος ἐπὶ λευκόν, ἀπὸ λευκοῦ δ' ἐπ' αἶρα, καὶ ἀπὸ
 15 τούτου ἐφ' ὑγρόν, ἀφ' οὗ ἐμνήσθη μετοπώρου, ταύ-
 την ἐπιζητῶν τὴν ὥραν. ἔοικε δὲ καθόλου ἀρχὴ
 καὶ τὸ μέσον πάντων· εἰ γὰρ μὴ πρότερον, ὅταν
 ἐπὶ τοῦτο ἔλθῃ, μνησθήσεται, ἢ οὐκ ἐτ' οὐδὲ ἄλλο-
 θεν, οἷον εἴ τις νοήσειεν ἐφ' ὧν ΑΒΓΔΕΖΗΘ.
 20 εἰ γὰρ μὴ ἐπὶ τοῦ Ε μέμνηται, ἐπὶ τοῦ Θ¹ ἐμνήσθη·
 ἐντεῦθεν γὰρ ἐπ' ἄμφω κινήθῃναι ἐνδέχεται, καὶ
 ἐπὶ τὸ Δ καὶ ἐπὶ τὸ Ζ.² εἰ δὲ μὴ τούτων τι ἐπιζη-
 τεῖ, ἐπὶ τὸ Γ ἐλθὼν μνησθήσεται, εἰ τὸ Η ἢ τὸ Ζ
 ἐπιζητεῖ. εἰ δὲ μὴ, ἐπὶ τὸ Α· καὶ οὕτως αἰεὶ. τοῦ
 δ' ἀπὸ τοῦ αὐτοῦ ἐνίοτε μὲν μνησθῆναι ἐνίοτε δὲ
 25 μὴ, αἴτιον ὅτι ἐπὶ πλείω ἐνδέχεται κινήθῃναι ἀπὸ
 τῆς αὐτῆς ἀρχῆς, οἷον ἀπὸ τοῦ Γ ἐπὶ τὸ Ζ ἢ τὸ Δ.

Ἐὰν οὖν μὴ διὰ παλαιοῦ κινήται, ἐπὶ τὸ συνηθέ-
 στερον κινεῖται· ὥσπερ γὰρ φύσις ἤδη τὸ ἔθος.

¹ ΕΘ Bekk.² Ε Bekk.

^a This difficult passage, as it stands in Bekker's text, seems untranslatable. The smallest change which will give a meaning to it is to read H instead of EH, which has the authority of one ms., and to read F instead of E, which has no ms. authority, but is the suggestion of Mr. W. D. Ross. These alterations have been adopted. To assist the illustration the Greek letters have been transliterated as the first eight of the English alphabet.

^b It may be possible to travel from A to H, when it is

ON MEMORY AND RECOLLECTION, II.

search will follow. For remembering really depends upon the potential existence of the stimulating cause ; and there is this also that, as has been said, it arises from the man himself, and the stimuli which he has. But he must seize hold of the starting-point. For this reason some use loci for the purpose of recollecting. The reason for this is that men pass rapidly from one step to the next ; for instance from milk to white, from white to air, from air to damp ; after which one recollects autumn, supposing that one is trying to recollect that season. Generally speaking the middle point seems to be a good point to start from ; for one will recollect when one comes to this point, if not before, or else one will not recollect from any other. For instance,^a suppose one were thinking of a series, which may be represented by the letters ABCDEFGH ; if one does not recall what is wanted at E, yet one does at H ; (the reason for the failure at E is that) from that point it is possible to travel in either direction, that is either towards D or towards F. Supposing one is seeking for either G or F, one will recollect on arriving at C, if one wants G or F. If not then on arrival at A.^b Success is always achieved in this way. Sometimes it is possible to recall what we seek and sometimes not ; the reason being that it is possible to travel from the same starting-point in more than one direction ; for instance from C we may go direct to F or only to D.

If one is not moving along an old path, one tends to change one's movement to a more usual one ; for custom is second nature. We remember quickly on

not possible to travel from C to H, because, as is said above, the essential to success is the seizing on the right point from which to start.

452 ^a διὸ ἃ πολλάκις ἐννοοῦμεν, ταχὺ ἀναμνησκόμεθα·
³⁰ ὥσπερ γὰρ φύσει τόδε μετὰ τόδε ἐστίν, οὕτω καὶ
 ἐνεργείᾳ· τὸ δὲ πολλάκις φύσιν ποιεῖ. ἐπεὶ δ'
 452 ^b ὥσπερ ἐν τοῖς φύσει γίνεται, καὶ παρὰ φύσιν καὶ
 ἀπὸ τύχης, ἔτι μᾶλλον ἐν τοῖς δι' ἔθος, οἷς ἡ φύσις
 γε μὴ ὁμοίως ὑπάρχει· ὥστε κινήθησθαι ἐνίοτε κακεῖ
 καὶ ἄλλως, ἄλλως τε καὶ ὅταν ἀφέλκῃ ἐκεῖθεν
⁵ αὐτόσε πη. διὰ τοῦτο καὶ ὅταν δέῃ ὄνομα μνη-
 μονεῦσαι, παρόμοιον μὲν, εἰς δ' ἐκεῖνο σολοικίζομεν.
 τὸ μὲν οὖν ἀναμνησκέσθαι τοῦτον συμβαίνει τὸν
 τρόπον.

Τὸ δὲ μέγιστον, γνωρίζειν δεῖ τὸν χρόνον, ἢ
 μέτρῳ ἢ ἀορίστως. ἔστω δέ τι ᾧ κρίνει τὸν πλείω
 καὶ ἐλάττω· εὐλογον δ' ὥσπερ τὰ μεγέθη· νοεῖ γὰρ
 10 τὰ μεγάλα καὶ πόρρω οὐ τῷ ἀποτείνειν ἐκεῖ τὴν
 διάνοιαν, ὥσπερ τὴν ὄψιν φασὶ τινες (καὶ γὰρ μὴ
 ὄντων ὁμοίως νοήσει), ἀλλὰ τῇ ἀνάλογον κινήσει·
 ἔστι γὰρ ἐν αὐτῇ τὰ ὅμοια σχήματα καὶ κινήσεις.
 τίνι οὖν διοίσει, ὅταν τὰ μείζω νοῇ,¹ ὅτι ἐκεῖνα νοεῖ,
 ἢ τὰ ἐλάττω; πάντα γὰρ τὰ ἐντὸς ἐλάττω, ὥσπερ
 15 ἀνάλογον καὶ τὰ ἐκτός. ἔστι δ' ἴσως ὥσπερ καὶ
 τοῖς εἶδεσιν ἀνάλογον λαβεῖν ἄλλο ἐν αὐτῷ, οὕτω
 καὶ τοῖς ἀποστήμασιν. ὥσπερ οὖν εἰ τὴν ABBE
 κινεῖται, ποιεῖ τὴν Γ²Δ· ἀνάλογον γὰρ ἢ ΑΓ καὶ
 ἢ ΓΔ. τί οὖν μᾶλλον τὴν ΓΔ ἢ τὴν ΖΗ ποιεῖ;

¹ νοῇ ἢ ὅτι Β.² Α Δ Bekk.

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the lines on which our thought travels frequently ; for as in nature one thing follows another, so also in the exercise of a function ; and the repeated action makes it natural. But since just as in purely natural phenomena some things occur contrary to nature, and owing to chance, so still more in matters of habit, to which the term " natural " does not belong in the same sense ; so that in that region also things sometimes fall out otherwise, especially when something tends to divert the mind from one direction, and turn it in towards itself. This is why when one needs to remember a name, one remembers one like it, but fails to get the one we want. Recollection then occurs in this way.

But the most important factor in recollection is the time, either exactly or vaguely. Let it be granted that one possesses a faculty by which to distinguish lesser and greater time ; it is natural to suppose that we can distinguish these as we distinguish magnitudes. For the mind does not think of large things at a distance by stretching out to them, as some think that vision operates (for the mind will think of them equally easily if they are not there), but one thinks of them by a mental impulse ; for there are similar figures and movements in the mind. How then, when the mind thinks of bigger things, will it differ in thinking of them from when it thinks of smaller things ? For all things inside are smaller, and in a sense proportionate to those outside. Perhaps, then, just as we suppose that there is something in man corresponding to figures, we may assume that there is something similarly corresponding in distances. If, then, the mind thinks of the ratio $AB : BE$, it knows CD ; for AC and CD are in the same ratio as $AB : BE$. But

Time is an important factor.

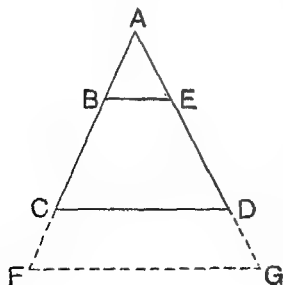
452 b

20 ἢ ὡς ἡ ΑΓ πρὸς τὴν ΑΒ ἔχει, οὕτως ἡ τὸ Θ πρὸς τὴν Ι' ἔχει. ταύτας οὖν ἅμα κινεῖται. ἂν δὲ τὴν ΖΗ βούληται νοῆσαι, τὴν μὲν ΒΕ ὁμοίως νοεῖ, ἀντὶ δὲ τῶν ΘΙ τὰς ΚΛ νοεῖ. αὗται γὰρ ἔχουσιν ὡς ΖΑ πρὸς ΒΑ.

"Όταν οὖν ἅμα ἡ τε τοῦ πράγματος γίνηται κίνησις καὶ ἡ τοῦ χρόνου, τότε τῇ μνήμῃ ἐνεργεῖ.
25 ἂν δ' οἴηται μὴ ποιῶν, οἴεται μνημονεύειν· οὐθὲν γὰρ κωλύει διαψευσθῆναί τινα καὶ δοκεῖν μνημονεύειν μὴ μνημονεύοντα. ἐνεργοῦντα δὲ τῇ μνήμῃ μὴ οἶεσθαι ἀλλὰ λανθάνειν μεμνημένον οὐκ ἔστιν· τοῦτο γὰρ ἦν αὐτὸ τὸ μεμνησθαι. ἀλλ' ἐὰν ἡ τοῦ πράγματος γένηται χωρὶς τῆς τοῦ χρόνου ἡ αὕτη ἐκείνης, οὐ μέμνηται.

80 'Η δὲ τοῦ χρόνου διττὴ ἐστίν· ὅτε μὲν γὰρ μέτρω
453 a οὐ μέμνηται αὐτό, οἷον ὅτι τρίτην ἡμέραν ὁδήποτε ἐποίησεν, ὅτε δὲ καὶ μέτρω· ἀλλὰ μέμνηται καὶ ἐὰν μὴ μέτρω. εἰώθασι δὲ λέγειν ὅτι μέμνηνται μὲν, πότε μέντοι οὐκ ἴσασιν, ὅταν τοῦ πότε μὴ γνωρίζωσι τὸ ποσὸν μέτρω.

¹ M Bekk.



^a If this figure represents A.'s train of thought his argument is as follows. If a man thinks of the ratio $AB : BE$, he can pass directly to the ratio $AC : CD$, for by the figure given he knows the ratio $AC : AB$, which we may call $H : I$. But to proceed to $AF : FG$ he would first have to determine the ratio $K : L$, that is the ratio $FA : BA$, which he does not know, because it is "outside."

ON MEMORY AND RECOLLECTION, II.

why then does thinking $AB : BE$ produce CD rather than FG ? Surely because AC has the same ratio to AB as H to I . And so the impulses to these movements are simultaneous. If then he wants to think FG , he thinks BE in the same way, but instead of HI , he thinks KL ; for this has the same ratio as FA to BA .^a

When the impulse of the fact and that of time occur simultaneously, then one actually remembers. But if a man imagines that these movements occur when they do not, then he imagines that he remembers; for there is nothing to prevent a man from being deceived about it, and from supposing that he remembers when he does not. But when a man actually remembers he cannot suppose that he does not, and remember without being aware of it; for recollection involves consciousness of it. But if the movement producing the object takes place apart from the time or the movement produces the time without the object, one fails to remember.

But the movement producing the time is a double one; at times one remembers a fact without an exact time, for instance that one did so and so the day before yesterday, but sometimes one knows it with an exact time; but it is still an act of memory, even if it does not connect with an exact time. Men are accustomed to say that they remember an occurrence, but that they do not remember when it occurred, when they cannot recognize exact limits to the time.

Recollection may be accurate except for time.

“Ὅτι μὲν οὖν οὐχ οἱ αὐτοὶ μνημονικοὶ καὶ ἀναμνηστικοί, ἐν τοῖς πρότερον εἴρηται. διαφέρει δὲ τοῦ μνημονεύειν τὸ ἀναμνησkesthai οὐ μόνον κατὰ
 5 τὸν χρόνον, ἀλλ’ ὅτι τοῦ μὲν μνημονεύειν καὶ τῶν ἄλλων ζώων μετέχει πολλά, τοῦ δ’ ἀναμνησkesthai οὐδὲν ὥς εἰπεῖν τῶν γνωριζομένων ζώων, πλὴν ἄνθρωπος. αἴτιον δ’ ὅτι τὸ ἀναμνησkesthai ἐστὶν οἶον συλλογισμός τις· ὅτι γὰρ πρότερον εἶδεν ἢ ἤκουσεν ἢ τι τοιοῦτον ἔπαθε, συλλογίζεται ὁ ἀναμνησκόμενος, καὶ ἐστὶν οἶον ζήτησίς τις. τοῦτο
 10 δ’ οἷς καὶ τὸ βουλευτικὸν ὑπάρχει, φύσει μόνοις συμβέβηκεν· καὶ γὰρ τὸ βουλευέσθαι συλλογισμός τις ἐστίν.

“Ὅτι δ’ ἐστὶ σωματικόν τι τὸ πάθος καὶ ἡ ἀναμνησις ζήτησις ἐν τοιούτῳ φαντάσματος, σημείον τὸ παρενοχλεῖν ἐνίους, ἐπειδὰν μὴ δύνωνται ἀναμνησθῆναι, καὶ πάννυ ἐπέχοντες τὴν διάνοιαν, καὶ οὐκέτ’
 15 ἐπιχειροῦντας ἀναμνησkesthai οὐδὲν ἤττον, καὶ μάλιστα τοὺς μελαγχολικοὺς· τούτους γὰρ φαντάσματα κινεῖ μάλιστα. αἴτιον δὲ τοῦ μὴ ἐπ’ αὐτοῖς εἶναι τὸ ἀναμνησkesthai, ὅτι καθάπερ τοῖς βάλλουσιν οὐκέτι ἐπ’ αὐτοῖς τὸ στησαι, οὕτω καὶ
 20 ὁ ἀναμνησκόμενος καὶ θηρεύων σωματικόν τι κινεῖ, ἐν ᾧ τὸ πάθος. μάλιστα δ’ ἐνοχλοῦνται οἷς ἂν ὑγρότης τύχη ὑπάρχουσα περὶ τὸν αἰσθητικὸν τόπον· οὐ γὰρ ῥαδίως παύεται κινήθεισα, ἕως ἂν ἐπέλθῃ τὸ ζητούμενον καὶ εὐθυπορήσῃ ἢ κίνησις. διὸ καὶ ὄργαι καὶ φόβοι, ὅταν τι κινήσωσιν, ἀντι-
 25 κινούντων πάλιν τούτων οὐ καθίστανται, ἀλλ’ ἐπὶ τὸ αὐτὸ ἀντικινούσιν. καὶ ἔοικε τὸ πάθος τοῖς

ON MEMORY AND RECOLLECTION, II.

We have laid it down before that those who have good memories are not the same as those who recall quickly. Recollecting differs from memory not merely in the matter of time, but also because many other living creatures share in memory, but none of the known so-called animals can recollect except man. This is because recollecting implies a process of reasoning ; for when a man is recollecting he reasons that he has seen or heard or experienced something of the sort before, and the process is a kind of search. This power can only belong by nature to such animals as have a power of deliberation ; and deliberation is a process of reasoning.

But the fact that the experience is in some sense bodily, and that recollection is the search for a mental picture in a body, is proved by the annoyance which some men show when they cannot remember, and because they are none the less perturbed in mind even when they have abandoned the attempt to recollect, and especially those of morbid temperament ; for these are specially moved by mental pictures. But the reason why the recollecting does not lie in their power is, just as when men have thrown a stone they cannot stop it, so also the man who is employed in recollecting and search sets up a bodily movement in which the effect takes place. And most disturbed are those who have moisture in the region of their sense perception ; for the movement initiated does not readily stop, until it arrives at the object sought, and the mind again travels on a straight course. For this reason too outbursts of temper or fear, when they have once produced an impulse, do not cease even when the subjects of them set up counter movements, but they themselves produce counter reaction. And

Memory and
recollection
further
disting-
uished.

Recollection
has bodily
reactions.

ARISTOTLE

458 a ὀνόμασι καὶ μέλεσι καὶ λόγοις, ὅταν διὰ στόματος
 90 γένηται τι αὐτῶν σφόδρα· παυσαμένοις γὰρ καὶ οὐ
 βουλομένοις ἐπέρχεται πάλιν ᾄδειν ἢ λέγειν.

Εἰσὶ δὲ καὶ οἱ τὰ ἄνω μείζω ἔχοντες καὶ οἱ νανώ-
 458 b δεις ἀμνημονέστεροι τῶν ἐναντίων διὰ τὸ πολὺ
 βάρος ἔχειν ἐπὶ τῷ αἰσθητικῷ, καὶ μήτ' ἐξ ἀρχῆς
 τὰς κινήσεις δύνασθαι ἐμμένειν ἀλλὰ διαλύεσθαι,
 μήτ' ἐν τῷ ἀναμιμνήσκεσθαι ῥαδίως εὐθυπορεῖν.
 5 οἱ δὲ πάμπαν νέοι καὶ λίαν γέροντες ἀμνήμονες διὰ
 τὴν κίνησιν· οἱ μὲν γὰρ ἐν φθίσει, οἱ δ' ἐν αὐξήσει
 πολλῇ εἰσίν· ἔτι δὲ τὰ γε παιδία καὶ νανώδη ἐστὶ
 μέχρι πόρρω τῆς ἡλικίας.

Περὶ μὲν οὖν μνήμης καὶ τοῦ μνημονεύειν, τίς ἡ
 φύσις αὐτῶν καὶ τίνι τῶν τῆς ψυχῆς μνημονεύει τὰ
 10 ζῶα, καὶ περὶ τοῦ ἀναμιμνήσκεσθαι, τί ἐστι καὶ
 πῶς γίνεται καὶ διὰ τίν' αἰτίαν, εἴρηται.

ON MEMORY AND RECOLLECTION, II.

the same experience occurs with names, tunes and words, when once they have passed through the mouth emphatically; for even though they check them, and quite against their will, they sing or say the same thing again and again.

Those who have specially large upper parts and dwarfs have less good memories than their opposites, because they carry a great weight on their organ of perception, and the movements which begin from the starting-point cannot keep to it, but stray from it, and do not easily travel in a straight course in their recollecting. The very young and the very old have inferior memories because they are in a state of transition; for the latter are in a state of rapid decay, and the former in a state of rapid growth; small children moreover are dwarfed, until they reach mature age.

This concludes our account of memory and remembering, describing its nature and that part of the soul with which living creatures remember. Also what recollecting is, and how it occurs, and for what reason.

Reasons for
good and
bad
memories.

ON SLEEP AND WAKING

INTRODUCTION

ARISTOTLE's treatment of this subject is full of interest for the modern reader. After some preliminary considerations on the subject he decides that sleep is really a physical phenomenon, in that it means that the sense organs temporarily cease to function, though he is careful to explain that it is not entirely physical, as a body without a soul could not feel. He is interested in the fact that in sleep it is not one or more senses which cease to function but all of them, and therefore decides that it is the "common sense" which is affected.

He then turns to the physiological explanation of the phenomenon we know as sleep. This subject is obscure to-day. Physiologists are sure that somehow the flow of blood to the nerve centres of the brain is checked, and that in consequence these nerve centres receive a reduced supply of oxygen. This shortage of oxygen produces an anaesthesia. Further than this modern physiology is not prepared to go, and it is quite uncertain why or how the flow of blood to the nerve centres of the brain is effected.

What is surprising about Aristotle's physiology is not that he knows so little but that he knows so much. He is quite clear that sleep has some connexion with the blood stream, and some of his statements about the movement of the blood seem to

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foreshadow a theory of the circulation which was not understood until Harvey's discoveries at the beginning of the seventeenth century.

It is also most interesting to find that he regards sleep as part of Nature's admirable design to secure the health of the body, and is true to his principle that all natural functions are part of an ordered scheme of things.

ΠΕΡΙ ΥΠΝΟΥ ΚΑΙ ΕΓΡΗΓΟΡΣΕΩΣ

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- Ι. Περὶ δὲ ὕπνου καὶ ἐγρηγόρσεως σκεπτέον, τίνα
τε τυγχάνει ὄντα, καὶ πότερον ἴδια τῆς ψυχῆς ἢ τοῦ
σώματος ἢ κοινά, καὶ ἢ κοινά, τίνος μορίου τῆς
ψυχῆς ἢ τοῦ σώματος· καὶ διὰ τίν' αἰτίαν ὑπάρχει
15 τοῖς ζώοις· καὶ πότερον ἅπαντα κεκοινωνήκεν
αὐτῶν ἀμφοτέρων, ἢ τὰ μὲν ὕπνου τὰ δὲ θατέρου
μόνον, ἢ τὰ μὲν οὐδετέρου τὰ δ' ἀμφοτέρων· πρὸς
δὲ τούτοις τί ἐστὶ τὸ ἐνύπνιον, καὶ διὰ τίν' αἰτίαν
οἱ καθεύδοντες ὅτε μὲν ὀνειρώττουσιν ὅτε δ' οὐ·
ἢ συμβαίνει μὲν αἰεὶ τοῖς καθεύδουσιν ἐνυπνιάζειν,
20 ἀλλ' οὐ μνημονεύουσιν· καὶ εἰ τοῦτο γίνεται, διὰ
τίνα αἰτίαν γίνεται· καὶ πότερον ἐνδέχεται τὰ
μέλλοντα προορᾶν, ἢ οὐκ ἐνδέχεται καὶ τίνα τρόπον,
εἰ ἐνδέχεται· καὶ πότερον τὰ μέλλοντα ὑπ' ἀνθρώ-
που πράσσεσθαι μόνον, ἢ καὶ ὦν τὸ δαιμόνιον ἔχει
τὴν αἰτίαν καὶ φύσει γίνεται ἢ ἀπὸ ταυτομάτου.
25 Πρῶτον μὲν οὖν τοῦτό γε φανερόν, ὅτι τῷ αὐτῷ
τοῦ ζώου ἢ τε ἐγρηγόρσις ὑπάρχει καὶ ὁ ὕπνος·
ἀντίκεινται γάρ, καὶ φαίνεται στέρησις τις ὁ ὕπνος
τῆς ἐγρηγόρσεως· αἰεὶ γὰρ τὰ ἐναντία καὶ ἐπὶ τῶν
ἄλλων καὶ ἐν τοῖς φυσικοῖς ἐν τῷ αὐτῷ δεκτικῷ

ON SLEEP AND WAKING

I. We have now to consider questions concerning sleep and wakefulness. What are they? Are they peculiar to the soul or to the body, or do they belong to both? If they belong to both, to which part of the soul or body do they belong? Why are they characteristic of living creatures? Do all living creatures share in both, or do some have sleep only, and some wakefulness only, or do some have neither and some both? Furthermore what is a dream, and why do men when asleep sometimes dream and sometimes not? Or do sleepers always dream, but sometimes do not remember their dreams? If the latter is true, why does it occur? Is it possible or impossible to foresee the future? If it is possible, in what way? Again, if it is possible, does it apply to actions which man will do, or can it include those done by a god, and those which occur in the ordinary course of nature, or those which happen without outside causation?

Problems arising from the subject.

To begin with, this is at any rate obvious, that wakefulness and sleep belong to the same part of the living creature; for they are contraries, and sleep appears to be in a sense only a negation of wakefulness; for contraries both in other cases and in natural science evidently occur in the same recipient,

Sleep and wakefulness are complementary.

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φαίνεται γινόμενα καὶ τοῦ αὐτοῦ ὄντα πάθη, λέγω
 30 δ' οἷον ὑγίεια καὶ νόσος, καὶ κάλλος καὶ αἰσχος, καὶ
 ἰσχύς καὶ ἀσθένεια, καὶ ὄψις καὶ τυφλότης, καὶ
 454 a ἀκοή καὶ κωφότης. ἔτι δὲ καὶ ἐκ τῶνδε δῆλον.
 ὦ γὰρ τὸν ἐγρηγορότα γνωρίζομεν, τούτῳ καὶ
 τὸν ὑπνοῦντα· τὸν γὰρ αἰσθανόμενον ἐγρηγορέναι
 νομίζομεν καὶ τὸν ἐγρηγορότα πάντα ἢ τῶν ἔξωθέν
 τινος αἰσθάνεσθαι ἢ τῶν ἐν αὐτῷ κινήσεων. εἰ
 5 τοίνυν τὸ ἐγρηγορέναι ἐν μηδενὶ ἄλλῳ ἐστὶν ἢ
 τῷ αἰσθάνεσθαι, δῆλον ὅτι ὦπερ αἰσθάνεται, τούτῳ
 καὶ ἐγρήγορε τὰ ἐγρηγορότα καὶ καθεύδει τὰ καθ-
 εύδοντα.

Ἐπεὶ δ' οὔτε τῆς ψυχῆς ἴδιον τὸ αἰσθάνεσθαι οὔτε
 τοῦ σώματος (οὗ γὰρ ἡ δύναμις, τούτου καὶ ἡ
 ἐνέργεια· ἡ δὲ λεγομένη αἴσθησις, ὡς ἐνέργεια,
 10 κίνησίς τις διὰ τοῦ σώματος τῆς ψυχῆς ἐστὶ),
 φανερόν ὡς οὔτε τῆς ψυχῆς τὸ πάθος ἴδιον, οὔτ'
 ἄψυχον σῶμα δυνατόν αἰσθάνεσθαι.

Διωρισμένων δὲ πρότερον ἐν ἐτέροις περὶ τῶν
 λεγομένων ὡς μορίων τῆς ψυχῆς, καὶ τοῦ μὲν
 θρεπτικοῦ χωριζομένου τῶν ἄλλων ἐν τοῖς ἔχουσι
 σώμασι ζώην, τῶν δ' ἄλλων οὐδενὸς ἄνευ τούτου,
 15 δῆλον ὡς ὅσα μὲν αὐξήσεως καὶ φθίσεως μετέχει
 μόνον τῶν ζώντων, ὅτι τούτοις οὐχ ὑπάρχει ὕπνος
 οὐδ' ἐγρήγορις, οἷον τοῖς φυτοῖς· οὐ γὰρ ἔχουσι τὸ
 αἰσθητικὸν μόριον, οὔτ' εἰ χωριστόν ἐστιν οὔτ' εἰ
 μὴ χωριστόν· τῇ γὰρ δυνάμει καὶ τῷ εἶναι χωριστόν
 ἐστίν.

20 Ὅμοίως δὲ καὶ ὅτι οὐδέν ἐστιν ὃ ἀεὶ ἐγρήγορεν
 ἢ ἀεὶ καθεύδει, ἀλλὰ τοῖς αὐτοῖς ὑπάρχει τῶν ζώων

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and are affections of the same subject ; such, I mean, as health and disease, beauty and ugliness, strength and weakness, sight and blindness, hearing and deafness. And the same point is clear from the following facts. We recognize the man awake by the same signs as the man asleep ; for we reckon that the man who is conscious of sensation is awake, and that every man who is awake is conscious either of some movement outside himself, or of one inside himself. If then wakefulness cannot exist in any case apart from sensation, it is clear that what is awake is so in respect of its consciousness, and what is asleep is asleep in respect of its consciousness.

But since sensation does not belong specifically either to soul or body (for actuality belongs to that part to which potentiality belongs ; but the sensation in question, as an actuality, is a movement of the soul through the vehicle of the body), it is clear that the affection (sleep) is not peculiar to the soul, while on the other hand a body without a soul could not feel.

Both belong
to soul and
body.

Elsewhere^a we have previously classified the so-called parts of the soul, the nutritive part being separate from the others in those bodies which have life, but none of the others existing without this. It is therefore clear that those living creatures which have no characteristics except growth and decay, such as plants, cannot have either sleep or wakefulness. For they do not possess the necessary perceptive part, whether this is separable or inseparable ; for this perceptive part is separable both potentially and actually.

Similarly it is obvious that there is nothing which is either awake or asleep permanently, but both these

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ἀμφότερα τὰ πάθη ταῦτα· οὔτε γὰρ εἴ τί ἐστι
ζῶον μὴ¹ ἔχον αἴσθησιν, τοῦτ' ἐνδέχεται οὔτε
καθεύδειν οὔτ' ἐγρηγορέναι· ἄμφω γάρ ἐστι τὰ
πάθη ταῦτα περὶ αἴσθησιν τοῦ πρώτου αἰσθητικοῦ.
οὐκ ἐνδέχεται δὲ οὐδὲ θάτερον τούτων αἰεὶ ὑπάρχειν
25 τῷ αὐτῷ, οἷον αἰεὶ τι γένος ζώων καθεύδειν ἢ αἰεὶ
τι ἐγρηγορέναι. ἔτι ὅσων ἐστί τι ἔργον κατὰ
φύσιν, ὅταν ὑπερβάλλῃ τὸν χρόνον ᾧ δύναται χρόνῳ
τι ποιεῖν, ἀνάγκη ἀδυνατεῖν, οἷον τὰ ὄμματα ὀρώντα
καὶ παύεσθαι τοῦτο ποιοῦντα, ὁμοίως δὲ καὶ χεῖρα
80 καὶ ἄλλο πᾶν οὗ ἐστί τι ἔργον. εἰ δὴ τινός ἐστιν
ἔργον τὸ αἰσθάνεσθαι, καὶ τοῦτο ἂν ὑπερβάλλῃ
ὅσον ἦν χρόνον δυνάμενον αἰσθάνεσθαι συνεχῶς,
ἀδυνατήσει καὶ οὐκέτι τοῦτο ποιήσει. εἰ τοίνυν τὸ
454 b ἐγρηγορέναι τούτῳ² ὥρισται τῷ λελύσθαι τὴν
αἴσθησιν, τῶν δ' ἐναντίων τὸ μὲν ἀνάγκη παρῆναι
τὸ δ' οὔ, τὸ δ' ἐγρηγορέναι τῷ καθεύδειν ἐναντίον,
καὶ ἀναγκαῖον παντὶ θάτερον ὑπάρχειν, ἀναγκαῖον
ἂν εἶη καθεύδειν. εἰ οὖν τὸ τοιοῦτον πάθος ὕπνος,
5 τοῦτο δ' ἐστὶν ἀδυναμία δι' ὑπερβολὴν τοῦ ἐγρηγο-
ρέναι, ἣ δὲ τοῦ ἐγρηγορέναι ὑπερβολὴ ὅτε μὲν
νοσώδης ὅτε δ' ἄνευ νόσου γίνεται, ὥστε καὶ ἡ
ἀδυναμία καὶ ἡ διάλυσις ὡσαύτως ἔσται, ἀνάγκη
πᾶν τὸ ἐγρηγορὸς ἐνδέχεσθαι καθεύδειν· ἀδύνατον
γὰρ αἰεὶ ἐνεργεῖν. ὁμοίως δὲ οὐδὲ καθεύδειν οὐδὲν
10 αἰεὶ ἐνδέχεται. ὁ γὰρ ὕπνος τι τοῦ αἰσθητικοῦ
μορίου ἐστίν, οἷον δεσμός καὶ ἀκινήσις τις, ὥστ'

¹ μὴ om. B.² τούτῳ om. B.

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affections are the properties of the same animals ; for if there is any animal having no sense consciousness, it cannot be either asleep or awake ; for both these affections are concerned with the sensation of the first sense perception. Nor can either sleep or wakefulness be a permanent attribute of the same animal : for instance no species of animal can be permanently asleep or permanently awake. For in the case of all the parts possessing any function, when they have passed the time in which they are able to perform their function, they must become impotent ; for instance the eyes seeing must also cease to function, and similarly the hand, and any other part which has a function. If then sensation is a function of any part, and if this goes beyond the time when it is capable of having continuous sensation, it will become impotent, and cease to perform its function. If then loss of consciousness marks the limit of wakefulness, and if one of two opposites must be present and the other not, and further if it is admitted that wakefulness is the opposite of being asleep, and if one of the two opposites must exist in any given case, then sleep must be a necessity. If sleep is an affection of such a kind, I mean if it is a state of impotence due to excess of wakefulness, and excess of wakefulness regularly occurs sometimes as the result of disease, and sometimes when there is no disease, so that impotence and failure of sensation also sometimes are and sometimes are not due to disease, everything which is awake must be capable of sleep ; for it cannot be permanently active. Similarly nothing can be permanently asleep. For sleep is characteristic of the sensitive part of us, a kind of fether, or immobility, whence it follows that

Neither condition can be permanent.

Sleep is logically necessary.

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ἀνάγκη πᾶν τὸ καθεῦδον ἔχειν τὸ αἰσθητικὸν μόριον. αἰσθητικὸν δὲ τὸ δυνατόν αἰσθάνεσθαι κατ' ἐνέργειαν· ἐνεργεῖν δὲ τῇ αἰσθήσει κυρίως καὶ ἀπλῶς ἀδύνατον καθεῦδον ᾅμα· διὸ ἀναγκαῖον ὕπνον πάντα ἐγερτὸν εἶναι.

- 15 Τὰ μὲν οὖν ἄλλα σχεδὸν πάντα δῆλα κοινωνοῦνθ' ὕπνου, καὶ πλωτὰ καὶ πτηνὰ καὶ πεζά· καὶ γὰρ τὰ τῶν ἰχθύων γένη πάντα καὶ τὰ τῶν μαλακίων ὥπται καθεύδοντα, καὶ τᾶλλα πάνθ' ὅσα περ ἔχει ὀφθαλμούς· καὶ γὰρ τὰ σκληρόφθαλμα φανερά καὶ τὰ ἔντομα κοιμώμενα· βραχύυπνα δὲ τὰ τοιαῦτα
20 πάντα, διὸ καὶ λάθοι ἂν τινα πολλάκις πότερον μετέχουσι τοῦ καθεύδειν ἢ οὔ. τῶν δ' ὄστρακοδέρμων κατὰ μὲν τὴν αἰσθησιν οὐδέ πω γέγονε φανερόν εἰ καθεύδουσιν· εἰ δέ τω πιθανὸς ὁ λεχθεὶς λόγος, τούτῳ πεισθήσεται.

- Ὅτι μὲν οὖν ὕπνου κοινωνεῖ τὰ ζῶα πάντα,
25 φανερόν ἐκ τούτων· τῷ γὰρ αἰσθησιν ἔχειν ὥριστα τὸ ζῶον, τῆς δ' αἰσθήσεως τρόπον τινὰ τὴν μὲν ἀκινήσιαν καὶ οἷον δεσμόν τὸν ὕπνον εἶναί φάμεν, τὴν δὲ λύσιν καὶ τὴν ἄνεσιν ἐγρήγορσιν. τῶν δὲ φυτῶν οὐδὲν οἷόν τε κοινωνεῖν οὐδετέρου τούτων τῶν παθημάτων. ἄνευ μὲν γὰρ αἰσθήσεως οὐχ
30 ὑπάρχει οὐθ' ὕπνος οὐτ' ἐγρήγορσις· οἷς δ' αἰσθησις ὑπάρχει, καὶ τὸ λυπεῖσθαι καὶ τὸ χαίρειν· οἷς δὲ ταῦτα, καὶ ἐπιθυμία. τοῖς δὲ φυτοῖς οὐδὲν ὑπάρχει τούτων. σημείον δ' ὅτι καὶ τὸ ἔργον τὸ αὐτοῦ
455 a ποιεῖ τὸ θρεπτικὸν μόριον ἐν τῷ καθεύδειν μᾶλλον ἢ ἐν τῷ ἐγρηγορέναι· τρέφεται γὰρ καὶ αὐξάνεται τότε μᾶλλον, ὥς οὐδὲν προσδεόμενα πρὸς ταῦτα τῆς αἰσθήσεως.

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everything which sleeps must possess this sensitive part. But a sensitive part is that which is capable of active sensation ; but sense activity in a complete and simple sense is impossible simultaneously with sleep ; so that sleep must be able to be aroused.

Practically all other animals share in sleep, in the sea, the air and on the land ; for all classes of fishes and the mollusca as well have been observed asleep, and all other animals which have eyes ; for it is clear that the hard-eyed animals and insects sleep ; these creatures only sleep for a short time, so that one might often doubt whether they share in sleep or not. In the case of the testacea no direct observation has yet proved whether they sleep or not. But if the foregoing argument appeals to anyone, he will be convinced that they do.

Living
things
which sleep.

Therefore that all animals share in sleep is obvious from the following considerations. The animal kingdom is defined by the possession of sensation, but we say that sleep is characteristic of sensation, a sort of immobility or fettering, and that the release or removal of this is wakefulness. But none of the plants can share in either of these affections, for neither sleep nor wakefulness is possible without sensation. But creatures possessing sensation also are capable of grief and joy ; and those which have these must also possess desire. But none of these are possessed by plants. Evidence of this is afforded by the fact that the nutritive faculty (in animals) exercises its function more in sleep than in wakefulness ; for at that time it absorbs more nourishment and grows more rapidly, because it does not require consciousness for these two purposes.

II. Διὰ τί δὲ καθεύδει καὶ ἐγρήγορε, καὶ διὰ
 5 ποίαν τιν' αἰσθησιν ἢ ποίας, εἰ διὰ πλείους, σκε-
 πτέον. ἐπεὶ δ' ἔνια μὲν τῶν ζώων ἔχει τὰς αἰσθήσεις
 πάσας, ἔνια δ' οὐκ ἔχει,¹ οἷον ὄψιν, τὴν δ' ἀφὴν καὶ
 τὴν γεῦσιν ἅπαντ' ἔχει, πλὴν εἴ τι τῶν ζώων ἀτελές
 (εἴρηται δὲ περὶ αὐτῶν ἐν τοῖς περὶ ψυχῆς),
 ἀδύνατον δ' ἐστὶν ἀπλῶς ὁποιοῦν αἰσθησιν αἰ-
 10 σθάνεσθαι τὸ καθεῦδον ζῶον, φανερόν ὅτι πᾶσιν
 ἀναγκαῖον ὑπάρχειν ταὐτὸ πάθος ἐν τῷ καλουμένῳ
 ὕπνῳ· εἰ γὰρ τῇ μὲν τῇ δὲ μή, ταύτῃ καθεῦδον
 αἰσθῆσεται, τοῦτο δ' ἀδύνατον.

Ἐπεὶ δ' ὑπάρχει καθ' ἐκάστην αἰσθησιν τὸ μὲν
 τι ἴδιον τὸ δέ τι κοινόν, ἴδιον μὲν οἷον τῇ ὄψει τὸ
 15 ὁράν, τῇ δ' ἀκοῇ τὸ ἀκούειν, ταῖς δ' ἄλλαις κατὰ
 τὸν αὐτὸν τρόπον· ἔστι δέ τις καὶ κοινὴ δύναμις
 ἀκολουθοῦσα πάσαις, ἣ καὶ ὅτι ὁρᾷ καὶ ἀκούει²
 αἰσθάνεται· οὐ γὰρ δὴ τῇ γε ὄψει ὁρᾷ ὅτι ὁρᾷ.
 καὶ κρίνει δὴ καὶ δύναται κρίνειν ὅτι ἕτερα τὰ
 γλυκέα τῶν λευκῶν, οὔτε γεύσει οὔτε ὄψει οὔτ'
 20 ἀμφοῖν, ἀλλὰ τινι κοινῷ μορίῳ τῶν αἰσθητηρίων
 ἀπάντων. ἔστι μὲν γὰρ μία αἰσθησις, καὶ τὸ
 κύριον αἰσθητήριον ἐν· τὸ δ' εἶναι αἰσθήσει τοῦ
 γένους ἐκάστου ἕτερον, οἷον ψόφου καὶ χρώματος.
 τοῦτο δ' ἅμα τῷ ἄπτικῳ μάλισθ' ὑπάρχει· (τοῦτο
 μὲν γὰρ χωρίζεται τῶν ἄλλων αἰσθητηρίων, τὰ δ'
 25 ἄλλα τούτου ἀχώριστα. εἴρηται δὲ περὶ αὐτῶν ἐν
 τοῖς περὶ ψυχῆς θεωρήμασιν.) φανερόν τοίνυν ὅτι

¹ ἔχουσι B.² ἀκούει καὶ B.

ON SLEEP AND WAKING, II.

II. We must now turn to the question why a creature sleeps or is awake, and owing to what sense or senses (if there be more than one). Since some living creatures have all the senses and some have not (for instance some have not sight), but all have touch and taste, unless they are imperfect (a question which has been discussed in the treatise *On the Soul*^a), and since it is impossible, strictly speaking, for the sleeping animal to have any sensation at all, it is evident that all are affected by the same condition in the state known as sleep; for if the condition affects one sense and not another, then there will be sensation with the latter sense while asleep, and this is impossible.

But every sense has both a special function of its own and one shared by other senses; the special function for instance of sight is seeing, and of audition hearing, and similarly with the other senses; but there is also a common function which accompanies them all, whereby one is conscious that one sees and hears: for it is not by sight that one is aware that one sees. And one judges and is capable of judging that sweet is different from white; but this is not by taste, nor by sight, nor by a combination of the two, but by some part which is common to all the sense organs; for there is one sensation, and one paramount sense organ; but the actual sense which apprehends each class is differentiated, for instance in the case of sound and colour. This is most conspicuous in the case of touch; (for this is separable from the other sense organs, but the others are inseparable from it. We have discussed this in our considerations *On the Soul*). It is clear then that wakefulness and sleep are an affection of this

The purpose of sleep.

Special and "common" sense.

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τούτου ἐστὶ πάθος ἡ ἐγρήγορσις καὶ ὁ ὕπνος. διὸ καὶ πᾶσιν ὑπάρχει τοῖς ζώοις· καὶ γὰρ ἡ ἀφή μόνῃ πᾶσιν. εἰ γὰρ τῷ πάσας τι πεπονθέναι τὰς αἰσθήσεις ἐγένετο τὸ καθεύδειν, ἄτοπον εἰ αἷς οὐτ' ἀνάγκη οὐτε δυνατόν τρόπον τινὰ ἐνεργεῖν ἅμα, ταύτας ἀναγκαῖον ἄργεῖν ἅμα καὶ ἀκίνητίζειν· τούναντίον γὰρ εὐλογώτερον συνέβαινεν ἂν αὐταῖς τὸ μὴ ἅμα ἡρεμεῖν. ὥς δὲ νῦν λέγομεν, εὐλόγως ἔχει καὶ περὶ τούτων· τοῦ γὰρ κυρίου τῶν ἄλλων πάντων αἰσθητηρίου καὶ πρὸς ὃ συντείνει τᾶλλα, πεπονθότος τι συμπάσχειν ἀναγκαῖον καὶ τὰ λοιπὰ πάντα, ἐκείνων δὲ τινος ἀδυνατοῦντος οὐκ ἀνάγκη τοῦτ' ἀδυνατεῖν.

455 b

Φανερόν δ' ἐκ πολλῶν ὅτι οὐκ ἐν τῷ τὰς αἰσθήσεις ἄργεῖν καὶ μὴ χρῆσθαι αὐταῖς ὁ ὕπνος, οὐδ' ἐν τῷ μὴ δύνασθαι αἰσθάνεσθαι. καὶ γὰρ ἐν ταῖς λιποψυχίαις τοιοῦτον συμβαίνει· ἀδυναμία γὰρ αἰσθήσεων ἢ λιποψυχία. γίνονται δὲ καὶ ἐκνοιαί τινες τοιαῦται. ἔτι δ' οἱ τὰς ἐν τῷ αὐχένι φλέβας καταλαμβανόμενοι ἀναίσθητοι γίνονται. ἀλλ' ὅταν ἡ ἀδυναμία τῆς χρήσεως μήτ' ἐν τῷ τυχόντι αἰσθητηρίῳ μήτε δι' ἣν ἔτυχεν αἰτίαν, ἀλλὰ καθάπερ εἴρηται νῦν, ἐν τῷ πρώτῳ ᾧ αἰσθάνεται πάντων· ὅταν μὲν γὰρ τοῦτ' ἀδυνατήσῃ, ἀνάγκη καὶ τοῖς αἰσθητηρίοις πᾶσιν ἀδυνατεῖν αἰσθέσθαι· ὅταν δ' ἐκείνων τι, οὐκ ἀνάγκη τούτῳ.

Δι' ἣν δ' αἰτίαν συμβαίνει τὸ καθεύδειν, καὶ ποῖόν τι τὸ πάθος ἐστὶ, λεκτέον. (ἐπεὶ δὲ τρόποι πλείους τῆς αἰτίας καὶ γὰρ τὸ τίνος ἕνεκα, καὶ

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common sense. For this reason they are attributes of all living creatures ; for touch alone is common to all such creatures. For if sleep were due to an affection of all the senses, it would be strange if those senses which need not, or cannot act simultaneously in any way, should necessarily be inoperative and immobile simultaneously ; the direct opposite would be more probable—that they should not all rest simultaneously. But the account we now give is a rational explanation of them also. For when that sense organ which is master of them all, and to which all the rest contribute, is affected in any way, all the others must be affected too, but it is not necessary that when any one of them is impotent that this master sense should also be impotent.

Sleep is
an affection
of the
"common
sense."

It is clear for many reasons that the essential factor of sleep is not the fact that the senses are inoperative and out of use, nor that it is impossible to have any sensation. For this happens in fainting ; for fainting is the impotence of the senses. Some forms of derangement belong to the same class. Again those who have the veins in the neck pressed also become unconscious. But sleep is when the incapacity for use occurs not in any chance sense organ, nor through any accidental cause, but, as we have just explained, when it happens to the first sense faculty by which one perceives all things ; when this becomes impotent, it must clearly be impossible to receive impressions from any of the sense organs ; but when any other of the sense faculties suffers impotence it need not apply to this one.

Now we have to consider the cause of sleep, and what sort of affection it is. (But there are many sorts of cause—the final cause, the cause in the sense

The cause
of sleep.

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ὅθεν ἡ ἀρχὴ τῆς κινήσεως, καὶ τὴν ὕλην καὶ τὸν λόγον αἷτιον εἶναι φάμεν,) πρῶτον μὲν οὖν ἐπειδὴ λέγομεν τὴν φύσιν ἐνεκά του ποιεῖν, τοῦτο δ' ἀγαθόν τι, τὴν δ' ἀνάπαυσιν παντὶ τῷ πεφυκότι κινεῖσθαι, μὴ δυναμένῳ δ' αἰεὶ καὶ συνεχῶς κινεῖσθαι
 20 μεθ' ἡδονῆς ἀναγκαῖον εἶναι καὶ ὠφέλιμον, τῷ δ' ὕπνῳ αὐτῇ τῇ ἀληθείᾳ¹ προσάπτουσι τὴν μεταφορὰν ταύτην ὡς ἀναπαύσει ὄντι· ὥστε σωτηρίας ἕνεκα τῶν ζώων ὑπάρχει. ἡ δ' ἐργήγορσις τέλος· τὸ γὰρ αἰσθάνεσθαι καὶ τὸ φρονεῖν πᾶσι τέλος οἷς ὑπάρχει θάτερον αὐτῶν· βέλτιστα γὰρ ταῦτα, τὸ δὲ τέλος
 25 βέλτιστον. ὥστε ἀναγκαῖον ἐκάστῳ τῶν ζώων ὑπάρχειν τὸν ὕπνον. λέγω δ' ἐξ ὑποθέσεως τὴν ἀνάγκην, ὅτι εἰ ζῶον ἔσται ἔχον τὴν αὐτοῦ φύσιν, ἐξ ἀνάγκης τιν' ὑπάρχειν αὐτῷ δεῖ, καὶ τούτων ὑπαρχόντων ἕτερα ὑπάρχειν.

Ἔτι δὲ ποίας κινήσεως καὶ πράξεως ἐν τοῖς
 30 σώμασι γιγνομένης συμβαίνει τό τε ἐργηγορέναι καὶ τὸ καθεύδειν τοῖς ζώοις, μετὰ ταῦτα λεκτέον. τοῖς μὲν οὖν ἄλλοις ζώοις καθάπερ τοῖς ἐναίμοις ὑποληπτέον εἶναι τὰ αἷτια τοῦ πάθους, ἢ ταῦτά ἢ τὰ ἀνάλογον, τοῖς δ' ἐναίμοις ἄπερ τοῖς ἀνθρώποις· ὥστ' ἐκ τούτων πάντα θεωρητέον.

458 a Ὅτι μὲν οὖν ἡ τῆς αἰσθήσεως ἀρχὴ γίνεται ἀπὸ τοῦ αὐτοῦ μέρους τοῖς ζώοις ἀφ' οὗπερ καὶ ἡ τῆς κινήσεως, διωρίζεται πρότερον ἐν ἑτέροις. αὕτη δ' ἐστὶ τριῶν διωρισμένων τόπων ὁ μέσος κεφαλῆς καὶ τῆς κάτω κοιλίας. τοῖς μὲν οὖν ἐναίμοις τοῦτ'
 5 ἐστὶ τὸ περὶ τὴν καρδίαν μέρος· πάντα γὰρ τὰ

¹ δι' αὐτὴν τὴν ἀλήθειαν B.

^a The three positions are the head, the heart and the stomach. Cf. *De Part. An.* 656 b 5.

ON SLEEP AND WAKING, II.

of the origin of the movement, the material cause and the formal cause.) First of all then, when we say that nature makes a thing with an end in view, and this end is some good, and that to everything which naturally moves, but cannot move always and continuously, rest must be combined with pleasure and be beneficial, we are applying a metaphor to sleep which contains the real truth, when we call it rest ; for it exists for the sake of the preservation of the living creature. But the state of wakefulness is its end ; for perception and thinking are the proper end of all creatures which have either of these capacities ; for they are the highest good, and the end is the highest good. So that sleep is essential to every kind of living creature. I use the word essential on the assumption that if a living creature is to realize its own nature certain characteristics must belong to it essentially, and if these do belong to it others will do so also.

Next we have to say what kind of movement and action it is which takes place in the body when sleep and wakefulness occur in animals. We must assume that the reasons of the affection in other animals are the same as, or analogous to, those operative in animals having blood, and the same in men as in these ; the whole speculation will depend on this assumption.

The nature of sleep and wakefulness.

In another place it has been laid down that the first principle of sensation arises from the same part among living creatures as the first principle of movement. It lies in one of three definite positions between the head and the lower part of the stomach.^a In the cases of animals with blood this is the region about the heart ; for all animals having blood possess

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- ἔναιμα καρδίαν ἔχει, καὶ ἡ ἀρχὴ τῆς κινήσεως καὶ
 τῆς αἰσθήσεως τῆς κυρίας ἐντεῦθεν ἐστίν. τῆς μὲν
 οὖν κινήσεως φανερόν ὅτι καὶ ἡ τοῦ πνεύματος
 ἀρχὴ καὶ ὅλως ἡ τῆς καταψύξεως ἐστίν ἐνταῦθα,
 καὶ τὸ ἀναπνεῖν τε καὶ τὸ ὑγρῷ καταψύχεσθαι πρὸς
 10 γε σωτηρίαν τοῦ ἐν τούτῳ τῷ μορίῳ θερμοῦ ἢ
 φύσις πεπόρικεν. ῥηθήσεται δὲ περὶ αὐτῆς ὕστερον
 καθ' αὐτήν. τοῖς δ' ἀναίμοις καὶ τοῖς ἐντόμοις καὶ
 μὴ δεχομένοις πνεῦμα ἐν τῷ ἀνάλογον τὸ σύμφυτον
 πνεῦμα ἀναφυσώμενον καὶ συνιζάνον φαίνεται,
 δηλὸν δὲ τοῦτο ἐπὶ τῶν ὀλοπτέρων, οἷον σφηκῶν
 15 καὶ μελισσῶν, καὶ ἐν ταῖς μυίαις καὶ ὅσα τοιαῦτα.
 ἐπεὶ δὲ κινεῖν μὲν τι ἢ ποιεῖν ἄνευ ἰσχύος ἀδύνατον,
 ἰσχὺν δὲ ποιεῖ ἡ τοῦ πνεύματος κάθεξις, τοῖς μὲν
 εἰσφερομένοις ἢ θύραθεν, τοῖς δὲ μὴ ἀναπνεύουσιν
 ἢ σύμφυτος. διὸ καὶ βομβοῦντα φαίνεται τὰ πτε-
 ρωτά, ὅταν κινήται, τῇ τρίψει τοῦ πνεύματος
 προσπίπτοντος πρὸς τὸ ὑπόζωμα τῶν ὀλοπτέρων.
 20 κινεῖται δὲ πᾶν αἰσθήσεώς τινος γινομένης, ἢ οἰ-
 κείας ἢ ἀλλοτρίας, ἐν τῷ πρώτῳ αἰσθητηρίῳ. εἰ
 δ' ἐστὶν ὁ ὕπνος καὶ ἡ ἐγρήγορσις πάθη τοῦ μορίου
 τούτου, ἐν ᾧ μὲν τόπῳ καὶ ἐν ᾧ μορίῳ πρώτῳ
 γίνεται ὁ ὕπνος καὶ ἡ ἐγρήγορσις, φανερόν.
 26 Κινοῦνται δ' ἔνιοι καθεύδοντες καὶ ποιοῦσι πολλὰ
 ἐγρηγορικά, οὐ μέντοι ἄνευ φαντάσματος καὶ αἰ-
 σθήσεώς τινος· τὸ γὰρ ἐνύπνιον ἐστὶν αἰσθημα
 τρόπον τινά. λεκτέον δὲ περὶ αὐτῶν ὕστερον.
 διότι δὲ τὰ μὲν ἐνύπνια μνημονεύουσιν ἐγερθέντες,

ON SLEEP AND WAKING, II.

a heart, and the first principle of movement and master sensation lies there. In the case of movement it is clear that the first principle of breathing, and generally speaking of cooling, is in the heart, and that nature has supplied both breathing and the power of cooling by moisture with a view to the preservation of the heat in that part. We shall discuss this in detail later on. In the case of bloodless animals, insects and those which do not breathe, the breath inherent in them is seen to rise and subside in the part which corresponds to the heart in other animals. This is obvious in the case of the insects with undivided wings, such as wasps and bees, and among flies, and similar creatures. But it is impossible to make any movement, or do any action, without strength, and the holding of the breath produces strength (breath from the outside in the case of animals which inhale, and implanted within in the case of those which do not). This is evidently the reason why winged creatures buzz when they move, when the air impinges with a rubbing movement on the diaphragm of the whole-winged insects. When any movement takes place sensation occurs, either its own or another's, in the first sense organ. But if sleep and wakefulness are affections of this part of the body, it is clear in what place, and in what part of the body sleep and wakefulness first occur.

Some people move when they are asleep, and perform the actions of wakefulness, but not without some mental image and some consciousness ; for a dream is in a way a form of sensation. We must discuss this subject later. Why men remember their dreams after they have been awakened, and yet fail

*Dreams
in sleep.*

456 a

τὰς δ' ἐγρηγορικὰς πράξεις οὐ μνημονεύουσιν, ἐν τοῖς προβληματικοῖς εἴρηται.

30 III. Ἐχόμενοι δὲ τῶν εἰρημένων ἐστὶν ἐπελθεῖν τῶν γινομένων καὶ πόθεν ἡ ἀρχὴ τοῦ πάθους γίνεται, τοῦ τ' ἐγρηγορέναι καὶ τοῦ καθεύδειν. φανερόν δὴ ὅτι ἐπεὶ ἀναγκαῖον τῷ ζῳῳ, ὅταν αἰσθήσιν ἔχῃ, τότε πρῶτον τροφήν τε λαμβάνειν καὶ αὔξῃσιν, τροφή δ' ἐστὶ πᾶσιν ἡ ἐσχάτη τοῖς μὲν

35 ἐναίμοις ἡ τοῦ αἵματος φύσις τοῖς δ' ἀναίμοις τὸ

456 b ἀνάλογον, τόπος δὲ τοῦ αἵματος αἱ φλέβες, τούτων δ' ἀρχὴ ἡ καρδιά· φανερόν δὲ τὸ λεχθὲν ἐκ τῶν ἀνατομῶν. τῆς μὲν οὖν θύραθεν τροφῆς εἰσιούσης εἰς τοὺς δεκτικούς τόπους γίνεται ἡ ἀναθυμίασις εἰς

5 τὰς φλέβας, ἐκεῖ δὲ μεταβάλλουσα ἐξαιματοῦται καὶ πορεύεται ἐπὶ τὴν ἀρχήν. εἴρηται δὲ περὶ τούτων ἐν τοῖς περὶ τροφῆς· νῦν δ' ἀναληπτέον ὑπὲρ αὐτῶν τούτου χάριν, ὅπως τὰς ἀρχὰς τῆς κινήσεως θεωρήσωμεν, καὶ τί πάσχοντος τοῦ μορίου τοῦ αἰσθητικοῦ συμβαίνει ἡ ἐγρηγόρσις καὶ ὁ ὕπνος. οὐ γὰρ ἐστὶν ὁ ὕπνος ἡτισοῦν ἀδυναμία

10 τοῦ αἰσθητικοῦ, καθάπερ εἴρηται· καὶ γὰρ ἔκνοια καὶ πνιγμός τις καὶ λιποψυχία ποιεῖ τὴν τοιαύτην ἀδυναμίαν. ἥδη δὲ γεγένηται τισι καὶ φαντασία λιποψυχήσασιν ἰσχυρῶς. τοῦτο μὲν οὖν ἔχει τινὰ ἀπορίαν· εἰ γὰρ ἐνδέχεται καταδαρθεῖν τὸν λιπο-

15 ψυχήσαντα, ἐνδέχοιτ' ἂν ἐνύπνιον εἶναι καὶ τὸ φάντασμα. πολλὰ δ' ἐστὶν ἃ λέγουσιν οἱ σφόδρα λιποψυχήσαντες καὶ δόξαντες τεθνάναι· περὶ ὧν τὸν αὐτὸν λόγον ὑποληπτέον εἶναι πάντων.

Ἄλλὰ γὰρ ὥσπερ εἵπομεν, οὐκ ἔστιν ὁ ὕπνος ἀδυναμία πᾶσα τοῦ αἰσθητικοῦ, ἀλλ' ἐκ τῆς περὶ τὴν τροφήν ἀναθυμιάσεως γίνεται τὸ πάθος τοῦτο·

ON SLEEP AND WAKING, II.—III.

to remember actions done in the waking state, has been discussed in our treatise on *Problems*.

III. Next in order we must discuss certain happenings, and whence the beginning of the affection known as waking and sleeping takes its rise. It is clear that the living creature absorbs food, and grows when it is necessary, when it has sensation. The nature of the blood is the final cause of nourishment in animals that have blood, and whatever corresponds to it in bloodless animals. The situation of the blood is the veins, and the fount is the heart. This is clear from the study of anatomy. When food enters from without into the place designed to receive it, an evaporation takes place into the veins, and changing there becomes blood and flows out again and returns to its source. This question has been discussed in the treatise on *Food*. Now we must resume the question with a view to considering the first principle of the movement, and in what way the sensitive part is affected, when wakefulness and sleep occur. For sleep cannot be defined as any impotence of the sensitive faculty, as has been said; for such impotence is produced by unconsciousness, throttling and faintness. Now even those in a dead faint may have some mental picture present. This then involves a difficulty; if it were possible that the man in a faint could be said to be asleep, the mental picture might be called a dream. Again, those in a dead faint, even when they are thought to be dead, say many things; and the same explanation, one would suppose, applies to them all.

But as we have said, sleep is not every impotence of the sensitive faculty, but the one that arises from the evaporation due to food; for that which is vapor-

The physical explanation of sleep.

How food acts.

456 b

- 20 ἀναγκαῖον γὰρ τὸ ἀναθυμιώμενον μέχρι τοῦ ὠθεῖ-
 σθαι, εἴτ' ἀντιστρέφειν καὶ μεταβάλλειν καθάπερ
 εὔριπον. τὸ δὲ θερμὸν ἐκάστου τῶν ζώων πρὸς τὸ
 ἄνω πέφυκε φέρεσθαι· ὅταν γ' ἐν τοῖς ἄνω τόποις
 γένηται, ἀθρόον πάλιν ἀντιστρέφει καὶ καταφέρεται.
 25 διὸ μάλιστα γίνονται ὕπνοι ἀπὸ τῆς τροφῆς· ἀθρόον
 γὰρ πολὺ τό τε ὑγρὸν καὶ τὸ σωματῶδες ἀνα-
 φέρεται. ἰστάμενον μὲν οὖν βαρύνει καὶ ποιεῖ
 νυστάζειν· ὅταν δὲ ῥέψῃ κάτω καὶ ἀντιστρέψαν
 ἀπόσῃ τὸ θερμόν, τότε γίνεται ὁ ὕπνος καὶ τὸ ζῶον
 καθεύδει. σημεῖον δὲ τούτων καὶ τὰ ὑπνωτικά·
 30 πάντα γὰρ κερηβαρίαν ποιεῖ, καὶ τὰ ποτὰ καὶ
 τὰ βρωτὰ, μήκων, μανδραγόρας, οἶνος, αἶραι. καὶ
 καταφερόμενοι καὶ νυστάζοντες τοῦτο δοκοῦσι
 πᾶσχειν, καὶ ἀδυνατοῦσιν αἶρειν τὴν κεφαλὴν καὶ
 τὰ βλέφαρα. καὶ μετὰ τὰ σῖτα μάλιστα τοιοῦτος
 ὁ ὕπνος· πολλὴ γὰρ ἡ ἀπὸ τῶν σιτίων ἀναθυμίασις.
 35 ἔτι δ' ἐκ κόπων ἐνίων· ὁ μὲν γὰρ κόπος συντη-
 κτικόν, τὸ δὲ σύντηγμα γίνεται ὥσπερ τροφή ἄ-
 457 a πεπτος, ἂν μὴ ψυχρὸν ᾖ. καὶ νόσοι δέ τινες ταῦτό
 τοῦτο ποιοῦσιν, ὅσαι ἀπὸ περιττώματος ὑγροῦ καὶ
 θερμοῦ, οἷον συμβαίνει τοῖς πυρέττουσι καὶ ἐν τοῖς
 ληθάργοις. ἔτι δ' ἡ πρώτη ἡλικία· τὰ γὰρ παιδία
 5 καθεύδει σφόδρα διὰ τὸ τὴν τροφήν ἄνω φέρεσθαι
 πᾶσαν. σημεῖον δὲ τὸ ὑπερβάλλειν τὸ μέγεθος τῶν
 ἄνω πρὸς τὰ κάτω κατὰ τὴν πρώτην ἡλικίαν, διὰ
 τὸ ἐπὶ ταῦτα γίνεσθαι τὴν αὐξήσιν. διὰ ταύτην δὲ
 τὴν αἰτίαν καὶ ἐπιληπτικά γίνεται· ὅμοιον γὰρ ὁ
 ὕπνος ἐπιλήψει, καὶ ἔστι τρόπον τινὰ ὁ ὕπνος
 10 ἐπιληψις. διὸ καὶ συμβαίνει πολλοῖς ἡ ἀρχὴ τούτου
 τοῦ πάθους καθεύδουσιν, καὶ καθεύδοντες μὲν
 ἀλίσκονται, ἐγρηγορότες δ' οὐ· ὅταν γὰρ πολὺ
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ized must be pushed on to a point, and then turn back, and change like water in a narrow channel. But in every animal the heat tends to rise ; when it reaches the upper parts, it collects, reverses its direction and is carried down. So sleepiness mostly occurs after food. For then both liquid and solid are collected in greatest quantity and carried up. During the time that it is stationary it is heavy and makes one nod : when the balance is shifted downwards, and reversing direction it drives out the heat, then sleep occurs, and the living creature sleeps. Narcotics prove this ; for they all produce a heavy head, both liquid and solid, such as poppy, mandragora, wine and darnel. When men are heavy and nod, they seem to suffer this affection, and cannot raise their heads or eyelids. Sleep of this kind occurs most often after food ; for the vapour arising from food is considerable. But it sometimes arises from fatigue ; for fatigue produces solution, and the solution is so to speak undigested, unless it is cold. Certain diseases produce the same result, such as arise from an excess of moisture and heat, as is the case with the feverish and comatose. The same thing is true of early childhood ; for children sleep a great deal, because all the food is borne upwards. The greater size of the upper parts in comparison with the lower in early youth proves this, and is due to the fact that growth is greatest in the upward direction. It is for this reason too that epilepsy occurs ; for sleep like epilepsy seizes one, and in a sense sleep is a seizure. Consequently in many cases epilepsy begins in sleep, and there are men who are seized with it when asleep, but not when awake. For the breath

457 a

φέρηται τὸ πνεῦμα ἄνω, καταβαῖνον πάλιν τὰς
 φλέβας ὀγκοῦ, καὶ συνθλίβει τὸν πόρον δι' οὗ ἡ
 ἀναπνοὴ γίνεται. διὸ τοῖς παιδίοις οὐ συμφέρουσιν
 15 οἱ οἶνοι, οὐδὲ ταῖς τίτθαις (διαφέρει γὰρ ἴσως οὐδὲν
 αὐτὰ πίνειν ἢ τὰς τίτθας), ἀλλὰ δεῖ πίνειν ὕδαρῇ
 καὶ ὀλίγον· πνευματῶδες γὰρ ὁ οἶνος, καὶ τούτου
 μᾶλλον ὁ μέλας. οὕτω δὲ τὰ ἄνω πλήρη τῆς τροφῆς
 τοῖς παιδίοις, ὥστε πέντε μηνῶν οὐδὲ στρέφουσι τὸν
 αὐχένα· ὥσπερ γὰρ τοῖς σφόδρα μεθύουσιν, ὑγρότης
 20 ἀναφέρεται πολλή. εὐλογον δὲ τοῦτ' εἶναι τὸ πάθος
 αἴτιον καὶ τοῦ ἡρεμεῖν ἐν ταῖς μήτραις τὰ ἔμβρυα
 τὸ πρῶτον. καὶ τὸ ὅλον δὲ φίλυπνοι οἱ ἀδελφό-
 φλεβοὶ καὶ οἱ νανώδεις καὶ οἱ μεγαλοκέφαλοι· τῶν
 μὲν γὰρ αἱ φλέβες στεναί, ὥστ' οὐ ράδιον διαρρεῖν
 25 κατιὸν τὸ ὑγρόν, τοῖς δὲ νανώδεσι καὶ μεγαλοκεφά-
 λοις ἡ ἄνω ὁρμὴ πολλή καὶ ἀναθυμιάσις. οἱ δὲ
 φλεβώδεις οὐχ ὑπνωτικοὶ δι' εὐροίαν τῶν φλεβῶν,
 ἂν μὴ τι ἄλλο πάθος ἔχωσιν ὑπεναντίον. οὐδ' οἱ
 μελαγχολικοί· κατέψυκται γὰρ ὁ εἶσω τόπος, ὥστ'
 οὐ γίνεται πλήθος αὐτοῖς ἀναθυμιάσεως. διὰ τοῦτο
 30 γὰρ καὶ βρωτικοὶ σκληροὶ ὄντες· ὥσπερ γὰρ οὐδὲν
 ἀπολελευκότα διάκειται τὰ σώματα αὐτοῖς. ἡ δὲ
 μέλαινα χολὴ φύσει ψυχρὰ οὔσα καὶ τὸν θρεπτικὸν
 τόπον ψυχρόν ποιεῖ καὶ τᾶλλα μόρια, ὅπου ἂν
 ὑπάρχη δύναμις τὸ τοιοῦτον περίττωμα.

457 b

Ὡστε φανερόν ἐκ τῶν εἰρημένων ὅτι ὁ ὕπνος
 ἐστὶ σύνοδος τις τοῦ θερμοῦ εἶσω καὶ ἀντιπερί-
 στασις φυσικὴ διὰ τὴν εἰρημένην αἰτίαν. διὸ πολλή
 ἡ κίνησις τοῦ ὑπνοῦντος. ὅθεν δ' ἐκλείπει, κατα-
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ON SLEEP AND WAKING, III.

when it has passed upwards strongly, then again descends, and swells the veins and chokes the passage through which respiration passes. This is why wine is not good for infants, nor for wet nurses (perhaps it makes no difference whether the infants or their nurses drink it), but they should drink watery things, and not in large quantities; for wine is windy and the darker wine most markedly so. The upper parts of infants are so full of food that for five months they do not even bend their necks; for as in the case of the very drunk, much moisture is carried upwards. Probably this is why the embryo lies quiet in the womb at first. Generally speaking, those with invisible veins, dwarfs, and those with big heads are most addicted to sleep; for their veins are narrow, so that the moisture in its descent cannot easily flow through, and with dwarfs and the big-headed the upward movement and the rising vapour are considerable. But those with marked veins are not much given to sleep owing to the easy flow in the veins, unless of course they have any counteracting malady. Nor are the melancholic inclined to sleep much; for the region within is chilled, so that there is not much rising vapour in their case. For this reason also they are inclined to eat much though they are spare; for their condition of body is such as not to profit by their food. Black bile also being by nature cold makes the nutritive and other parts cold, wherever there is potentially an excess of this kind.

So that it is obvious from what has been said that sleep is in a sense a meeting-place of the internal heat, and a natural reaction of the parts for the reason we have given. Therefore the movement of the sleeper is considerable. But when the heat fails he

Heat as
a factor.

ψύχεται, καὶ διὰ ψύξιν καταπίπτει τὰ βλέφαρα.
 5 καὶ τὰ μὲν ἄνω κατέψυκται καὶ τὰ ἔξω, τὰ δ' ἐντὸς
 καὶ τὰ κάτω θερμά, οἷον τὰ περὶ τοὺς πόδας καὶ
 τὰ εἴσω.

- Καίτοι τις ἀπορήσειεν ἄν, ὅτι μετὰ τὰ σιτία
 ἰσχυρότατος ὁ ὕπνος γίνεται, καὶ ἔστιν ὑπνωτικὰ
 οἶνος καὶ ἄλλα θερμότητος ἔχοντα τοιαύτας. ἔστι
 10 δ' οὐκ εὐλόγον· τὸν μὲν ὕπνον εἶναι κατάψυξιν, τὰ
 δ' αἷτια τοῦ καθεύδειν θερμά. πότερον οὖν τοῦτο
 συμβαίνει ὅτι ὥσπερ ἡ κοιλία κενὴ μὲν οὖσα θερμὴ
 ἔστιν, ἡ δὲ πλήρωσις αὐτὴν καταψύχει διὰ τὴν
 κίνησιν, οὕτω καὶ οἱ ἐν τῇ κεφαλῇ πόροι καὶ τόποι
 καταψύχονται ἀναφερομένης τῆς ἀναθυμιάσεως; ἢ
 15 ὥσπερ τοῖς προσχεομένοις τὸ θερμὸν ἐξαίφνης
 φρίκη γίνεται, καὶ κεῖ ἀνιόντος τοῦ θερμοῦ ἄθρο-
 ζόμενον τὸ ψυχρὸν καταψύχει, καὶ τὸ κατὰ φύσιν
 θερμὸν ποιεῖ ἐξαδυνατεῖν καὶ ὑποχωρεῖν; ἔτι δὲ
 πολλῆς ἐμπιπτούσης τροφῆς, ἣν ἀνάγει τὸ θερμὸν,
 ὥσπερ τὸ πῦρ ἐπιτιθεμένων τῶν ξύλων, κατα-
 ψύχεται, ἕως ἂν καταπεφθῇ.
 20 Γίνεται γὰρ ὁ ὕπνος, ὥσπερ εἴρηται, τοῦ σωμα-
 τώδους ἀναφερομένου ὑπὸ τοῦ θερμοῦ διὰ τῶν φλε-
 βῶν πρὸς τὴν κεφαλὴν. ὅταν δὲ μηκέτι δύνῃται,
 ἀλλὰ τῷ πλήθει ὑπερβάλλῃ τὸ ἀναχθέν, πάλιν ἀνταπ-
 ωθεῖται καὶ κάτω ρεῖ. διὸ καταπίπτουσί τε ὑπο-
 25 σπωμένου τοῦ θερμοῦ τοῦ ἀνάγοντος οἱ ἄνθρωποι
 (μόνον γὰρ ὀρθὸν τῶν ζώων), καὶ ἐπιπεσὸν μὲν
 ἔκνοιαν ποιεῖ, ὕστερον δὲ φαντασίαν. ἢ αἱ μὲν νῦν
 λεγόμεναι λύσεις ἐνδεχόμεναι μὲν εἰσι τοῦ γίνεσθαι
 τὴν κατάψυξιν· οὐ μὴν ἀλλὰ κύριός γ' ἐστὶν ὁ τόπος
 ὁ περὶ τὸν ἐγκέφαλον, ὥσπερ ἐν ἄλλοις εἴρηται.
 30 πάντων δ' ἐστὶ τῶν ἐν τῷ σώματι ψυχρότατον ὁ

ON SLEEP AND WAKING, III.

grows cold, and owing to this chilling his eyelids fall. The parts above and outside grow cold, but the parts below and within grow hot, such as the parts about the feet and those inside the body.

Yet one might see some difficulty in the fact that sleep becomes deepest after food, and that wine and other things which are naturally heating tend to produce sleep. It does not seem logical that sleep should be a chilling, while the causes of sleep are hot. Is it possible that just as the stomach is hot when empty, but the filling of it chills it because of the movement, so also the passages and region of the head grow cold when the vapour arises? Or is it similar to the condition of those over whom hot water is poured, who first of all shiver; so in this case as the heat rises the accumulated cold chills it, and makes what is naturally hot impotent and withdraw? But when much food is introduced which the heat draws up, just like fire when logs are put on it, it is chilled until it is digested.

A difficulty in this explanation.

For sleep comes, as has been said, when the bodily part is carried upwards by the heat through the veins to the head. But when this is no longer possible, but that which is carried upwards becomes excessive in amount, it is moved in the contrary direction and flows downwards. And so when the heat, which is the agent of rising, is withdrawn men fall down (for they alone of living creatures are erect), and the falling down produces loss of consciousness, and afterwards imagination. Or perhaps the suggested solutions are possible accounts of the chilling; but all the same the region about the brain has the mastery, as has been said in another connexion. But the brain is the coldest of all parts of the body, and, in

Various suggestions.

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ἐγκέφαλος, τοῖς δὲ μὴ ἔχουσι τὸ ἀνάλογον τούτῳ
μόριον. ὥσπερ οὖν τὸ ἀπατμίζον ὑγρὸν ὑπὸ τῆς
τοῦ ἡλίου θερμότητος, ὅταν ἔλθῃ εἰς τὸν ἄνω τόπον,
διὰ τὴν ψυχρότητα αὐτοῦ καταψύχεται καὶ συστάν

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καταφέρεται γεινόμενον πάλιν ὕδωρ, οὕτως ἐν τῇ
ἀναφορᾷ τοῦ θερμοῦ τῇ πρὸς τὸν ἐγκέφαλον ἢ μὲν
περιττωματικὴ ἀναθυμίασις εἰς φλέγμα συνέρχεται
(διὸ καὶ οἱ κατάρροι φαίνονται γιγνόμενοι ἐκ τῆς
κεφαλῆς), ἢ δὲ τρόφιμος καὶ μὴ ἰοσώδης κατα-
φέρεται συνισταμένη καὶ καταψύχει τὸ θερμόν.
πρὸς δὲ τὸ καταψύχεσθαι καὶ μὴ δέχεσθαι ῥαδίως
τὴν ἀναθυμίασιν συμβάλλεται καὶ ἡ λεπτότης καὶ
ἡ στενότης τῶν περὶ τὸν ἐγκέφαλον φλεβῶν. τῆς
μὲν οὖν καταψύξεως τοῦτ' ἐστὶν αἴτιον, καίπερ
10 τῆς ἀναθυμιάσεως ὑπερβαλλούσης τῇ θερμότητι.

Ἐγείρεται δ', ὅταν πεφθῇ καὶ κρατήσῃ ἡ συν-
εωσμένη θερμότης ἐν ὀλίγῳ πολλῇ ἐκ τοῦ περι-
εστώτος, καὶ διακριθῇ τό τε σωματωδέστρον αἷμα
καὶ τὸ καθαρώτατον. ἔστι δὲ λεπτότατον μὲν αἷμα
καὶ καθαρώτατον τὸ ἐν τῇ κεφαλῇ, παχύτατον δὲ

15

καὶ θολερώτατον τὸ ἐν τοῖς κάτω μέρεσιν. παντὸς
δὲ τοῦ αἵματος ἀρχή, ὥσπερ εἴρηται καὶ ἐνταῦθα καὶ
ἐν ἄλλοις, ἡ καρδιά. τῶν δ' ἐν τῇ καρδίᾳ ἐκατέρας
τῆς θαλάμης κοινὴ ἡ μέση· ἐκεῖνων δ' ἐκατέρα
δέχεται ἐξ ἐκατέρας τῆς φλεβός, τῆς τε μεγάλης
καλουμένης καὶ τῆς ἀορτῆς· ἐν δὲ τῇ μέσῃ γίνεται

20

ἡ διάκρισις. ἀλλὰ τὸ μὲν διορίζειν περὶ τούτων
ἐτέρων ἐστὶ λόγων οἰκειότερον. διὰ δὲ τὸ γίνεσθαι
ἀδιακριτώτερον τὸ αἷμα μετὰ τὴν τῆς τροφῆς
προσφορὰν ὃ ὕπνος γίνεται, ἕως ἂν διακριθῇ
τοῦ αἵματος τὸ μὲν καθαρώτερον εἰς τὰ ἄνω,
τὸ δὲ θολερώτερον εἰς τὰ κάτω· ὅταν δὲ τοῦτο

ON SLEEP AND WAKING, III.

those which have none, whatever part corresponds to the brain. Just as that which exhales water under the heat of the sun, when it reaches the upper region chills because of its coldness, and after condensing becomes water again, and is carried down, so in the rising of heat to the brain, the excessive rise of vapour collects into phlegm (and so colds seem to arise from the head), and the healthy and not detrimental evaporation is collected and carried down and chills the hot. The lightness and narrowness of the veins about the brain contribute to the chilling process and the reluctance to receive the rising vapour easily. This is the cause of the chilling, although the rising vapour is excessively hot.

Awakening occurs when digestion is complete ; the Awakening. heat previously collected in large quantity in a small space from its environment becomes more powerful and the more corporal is separated from the pure blood. The blood in the head is the lightest and purest, that in the lower parts of the body is thickest and most dense. But the fount of all blood, as has been said in this treatise and in others, is the heart ; and of the parts of the heart the middle connects with each ventricle ; for each of them receives blood from each vein, that which is called the " great vein " and the aorta ; and the separation happens in the middle. A more exact definition about these things is more proper to another subject. But sleep occurs because the blood is not so divided after the absorption of food, until the purer part of the blood is divided in the upper parts, and the thicker into the lower ;

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συμβῇ, ἐγείρονται ἀπολυθέντα τοῦ ἐκ τῆς τροφῆς
 βάρους.

Ἴι μὲν οὖν τὸ αἷτιον τοῦ καθεύδειν, εἴρηται, ὅτι ἡ
 ὑπὸ τοῦ σωματώδους τοῦ ἀναφερομένου ὑπὸ τοῦ
 συμφύτου θερμοῦ ἀντιπερίστασις ἀθρώως ἐπὶ τὸ
 πρῶτον αἰσθητήριον· καὶ τί ἐστὶν ὁ ὕπνος, ὅτι τοῦ
 πρῶτου αἰσθητηρίου κατάληψις πρὸς τὸ μὴ δύνα-
 110 σθαι ἐνεργεῖν, ἐξ ἀνάγκης μὲν γινόμενος (οὐ γὰρ
 ἐνδέχεται ζῶον εἶναι μὴ συμβαινόντων τῶν ἀπ-
 εργαζομένων αὐτό), ἔνεκα δὲ σωτηρίας· σώζει γὰρ
 ἢ ἀνάπαυσις.

ON SLEEP AND WAKING, III.

when this happens the parts awake, because they are separated from the heaviness of food.

We have thus explained the reason of sleep, that summary. it is the reaction by the bodily part which is carried upwards by its natural heat to the first sense organ ; as for what sleep is we have shown that it is a paralysis of the first sense organ to prevent it from functioning, and is a necessary process (for the animal could not exist unless something was present to fulfil its nature), that is for its preservation ; for rest preserves it.

ON DREAMS

INTRODUCTION

THIS subject is nearly as obscure to us as it was to Aristotle. In the present treatise the handling of the subject is full of interest, and contains some suggestions of real value. Aristotle first decides that our dreams are not directly due to perception, for by hypothesis our senses are all asleep. Yet he feels that they must have some connexion with perception, and that they imply the same sort of "imagination" as we employ in memory. He finds them analogous to the phenomenon we know as "persistence of vision," whereby we can still see an image (or seem to do so) which has actually passed from our sight. So he regards dreams as a kind of persistence of sense impressions received while awake. Their distortion he thinks similar to the distortion caused by rough water to a visual image.

ΠΕΡΙ ΕΝΥΠΝΙΩΝ

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I. Μετὰ δὲ ταῦτα περὶ ἐνυπνίων¹ ζητητέον, καὶ
458 b πρῶτον τίνι τῶν τῆς ψυχῆς φαίνεται, καὶ πότερον
τοῦ νοητικοῦ τὸ πάθος ἐστὶ τοῦτο ἢ τοῦ αἰσθητικοῦ·
τούτοις γὰρ μόνοις τῶν ἐν ἡμῖν γνωρίζομέν τι.

Εἰ δὲ χρήσις ὅψεως ὄρασις καὶ ἀκοῆς τὸ ἀκούειν
καὶ ὅλως αἰσθήσεως τὸ αἰσθάνεσθαι, κοινὰ δ' ἐστὶ
5 τῶν αἰσθήσεων ὅλον σχῆμα καὶ μέγεθος καὶ κίνησις
καὶ τᾶλλα τὰ τοιαῦτα, ἴδια δ' ὅλον χρῶμα ψόφος
χυμός, ἀδυνατεῖ δὲ πάντα μύοντα καὶ καθεύδοντα
ὄραν, ὁμοίως δὲ καὶ ἐπὶ καὶ λοιπῶν, δῆλον ὅτι οὐκ
αἰσθανόμεθα οὐδὲν ἐν τοῖς ὕπνοις. οὐκ ἄρα γε τῇ
αἰσθήσει τὸ ἐνύπνιον αἰσθανόμεθα.

10 Ἀλλὰ μὴν οὐδὲ τῇ δόξῃ. οὐ γὰρ μόνον τὸ προσιόν
φάμεν ἀνθρωπον ἢ ἵππον εἶναι, ἀλλὰ καὶ λευκὸν ἢ
καλόν· ὦν ἡ δόξα ἄνευ αἰσθήσεως οὐδὲν ἂν φήσειεν,
οὔτ' ἀληθῶς οὔτε ψευδῶς. ἐν δὲ τοῖς ὕπνοις
συμβαίνει τὴν ψυχὴν τοῦτο ποιεῖν· ὁμοίως γὰρ ὅτι
15 ἀνθρώπος καὶ ὅτι λευκὸς ὁ προσιὼν δοκοῦμεν ὄραν.
ἔτι παρὰ τὸ ἐνύπνιον ἐννοοῦμεν ἄλλο τι, καθάπερ

¹ ἐνυπνίων B.

ON DREAMS

I. Now our inquiry is concerned with dreams, and in the first place to what faculty of the soul they belong, and whether the affection belongs to the thinking or to the feeling part; for it is only by one of these faculties within us that we can attain knowledge.

Now if the employment of vision is seeing, and of hearing audition, and of feeling generally is sensation, and if again the perception of some things such as form, size, movement and other such things is shared by the senses, while others such as colour, sound and taste belong to special senses; if again everything that has its eyes shut and is asleep is incapable of seeing, and similarly with the other senses, it is clear that we have no perception in dreams at all. Therefore we do not see our dreams by perception.

Nor is it by opinion. For we do not merely say that the thing approaching is a man or a horse, but also that it is white or handsome; but on these points opinion could not pronounce, either truly or falsely, without perception. Yet the soul does these things in sleep; for we seem to see that the approaching object is a man, and also that he is white. Moreover in a dream we have some other concept, just as

Dreaming
is not
perception,

nor opinion.

458 b

ἐν τῷ ἐγρηγορέναι αἰσθανόμενοι τι· περὶ οὗ γὰρ αἰσθανόμεθα, πολλάκις καὶ διανοούμεθα τι. οὕτω καὶ ἐν τοῖς ὕπνοις παρὰ τὰ φαντάσματα ἐνίοτε ἄλλα ἐννοοῦμεν, φανείη δ' ἂν τῷ τοῦτο, εἴ τις προσ-
 20 ἔχοι τὸν νοῦν καὶ πειρῶτο μνημονεύειν ἀναστάς. ἤδη δέ τινες καὶ ἐωράκασιν ἐνύπνια τοιαῦτα οἷον οἱ δοκοῦντες κατὰ τὸ μνημονικὸν παράγγελμα τίθεσθαι τὰ προβαλλόμενα· συμβαίνει γὰρ αὐτοῖς πολλάκις ἄλλο τι παρὰ τὸ ἐνύπνιον τίθεσθαι πρὸ ὁμμάτων εἰς τὸν τόπον φάντασμα. ὥστε δῆλον ὅτι
 25 οὔτε ἐνύπνιον πᾶν τὸ ἐν ὕπνῳ φάντασμα, καὶ ὅτι ὃ ἐννοοῦμεν τῇ δόξῃ δοξάζομεν.

Δῆλον δὲ περὶ τούτων ἀπάντων τό γε τοσοῦτον, ὅτι τῷ αὐτῷ ᾧ καὶ ἐγρηγορότες ἐν ταῖς νόσοις ἀπατώμεθα, ὅτι τοῦτ' αὐτὸ καὶ ἐν τῷ ὕπνῳ ποιεῖ τὸ πάθος. καὶ ὑγιαίνουσι δὲ καὶ εἰδόσιν ὅμως ὁ ἥλιος ποδιαῖος εἶναι δοκεῖ. ἀλλ' εἴτε δὴ ταῦτόν
 30 εἴθ' ἕτερον τὸ φανταστικὸν τῆς ψυχῆς καὶ τὸ αἰσθητικόν, οὐδὲν ἥττον οὐ γίνεται ἄνευ τοῦ ὄραν καὶ αἰσθάνεσθαι τι· τὸ γὰρ παρορᾶν καὶ παρακούειν ὄρωντος ἀληθές τι καὶ ἀκούοντος, οὐ μέντοι τοῦτο ὃ οἶεται. ἐν δὲ τῷ ὕπνῳ ὑπόκειται μη-
 459 a δὲν ὄραν μηδ' ἀκούειν μηδ' ὅλως αἰσθάνεσθαι. ἀρ' οὖν τὸ μὲν μηδὲν ὄραν ἀληθές, τὸ δὲ μηδὲν πάσχειν τὴν αἴσθησιν οὐκ ἀληθές, ἀλλ' ἐνδέχεται καὶ τὴν ὄψιν πάσχειν τι καὶ τὰς ἄλλας αἰσθήσεις, ἕκαστον
 ε, δὲ τούτων ὥσπερ ἐγρηγορότος προσβάλλει μέν πως τῇ αἰσθήσει, οὐχ οὕτω δὲ ὥσπερ ἐγρηγορότος·
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ON DREAMS, 1.

if we perceived something while awake ; for we often have some thoughts about what we perceive. And so in sleep we sometimes have other thoughts beyond the mental pictures. This will become obvious to anyone if he reflects on it, and tries to remember his dream when he has awakened. Indeed some men have seen dreams of such a kind, for instance, those who seem to arrange what is put forward according to some principle of memorizing ; it often happens that these put some mental picture before their eyes beyond the dream itself. It is then clear that a dream does not consist entirely of a mental picture seen in sleep, but that we also form opinions as to what we think.

On the whole question this much at any rate is clear, that we are deceived precisely in the same part in which we are deceived in illness when awake ; that it is this part which causes the experience in sleep also. The sun appears to measure a foot across to men who are in health, and know its real measurement. But whether the part of the soul which constructs mental pictures is the same as the part which perceives them or not, in any case it does not occur without some vision and perception ; for to see and hear incorrectly is the property of one who sees and hears something real, but not what he thinks. But in sleep it is an axiom that one sees nothing, nor does one hear, nor has one any perception at all. Then " seeing nothing " is true, but that the senses experience nothing is not true, but it is possible that the sight and the other senses do experience something, but that each of them contributes to the sensation as they do in the case of a man awake, but not in the same way as when a man is awake. And in the one

Yet some
form of
percep-
tion is
necessary.

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καὶ ὅτε μὲν ἡ δόξα λέγει ὅτι ψεῦδος τὸ ὁρώμενον, ὥσπερ ἐγρηγορόσιν, ὅτε δὲ κατέχεται καὶ ἀκούθει τῷ φαντάσματι.

Ὅτι μὲν οὖν οὐκ ἔστι τοῦ δοξάζοντος οὐδὲ τοῦ διανοουμένου τὸ πάθος τοῦτο ὃ καλοῦμεν ἐνυπνιά-
 10 ζειν φανερόν. ἀλλ' οὐδὲ τοῦ αἰσθανομένου ἀπλῶς ὁρᾶν γὰρ ἂν ἦν καὶ ἀκούειν ἀπλῶς. ἀλλὰ πῶς δὴ καὶ τίνα τρόπον, ἐπισκεπτέον. ὑποκείσθω δ', ὅπερ ἐστὶ καὶ φανερόν, ὅτι τοῦ αἰσθητικοῦ τὸ πάθος, εἴπερ καὶ ὁ ὕπνος· οὐ γὰρ ἄλλω μὲν τινι τῶν ζώων ὑπάρχει ὁ ὕπνος, ἄλλω δὲ τὸ ἐνυπνιάζειν,
 15 ἀλλὰ τῷ αὐτῷ. ἐπεὶ δὲ περὶ φαντασίας ἐν τοῖς περὶ ψυχῆς εἴρηται, καὶ ἔστι μὲν τὸ αὐτὸ τῷ αἰσθητικῷ τὸ φανταστικόν, τὸ δ' εἶναι φανταστικῷ καὶ αἰσθητικῷ ἕτερον, ἔστι δὲ φαντασία ἡ ὑπὸ τῆς κατ' ἐνέργειαν αἰσθήσεως γινομένη κίνησις, τὸ δ' ἐνύπνιον φάντασμα τι φαίνεται εἶναι (τὸ γὰρ
 20 ἐν ὕπνῳ φάντασμα ἐνύπνιον λέγομεν, εἴθ' ἀπλῶς εἴτε τρόπον τινὰ γινόμενον), φανερόν ὅτι τοῦ αἰσθητικοῦ μὲν ἐστὶ τὸ ἐνυπνιάζειν, τούτου δ' ἢ τὸ φανταστικόν.

II. Τί δ' ἐστὶ τὸ ἐνύπνιον καὶ πῶς γίνεται, ἐκ τῶν περὶ τὸν ὕπνον συμβαινόντων μάλιστα ἂν
 25 θεωρήσαιμεν. τὰ γὰρ αἰσθητὰ καθ' ἕκαστον αἰσθητήριον ἡμῖν ἐμποιοῦσιν αἰσθήσιν, καὶ τὸ γινόμενον ὑπ' αὐτῶν πάθος οὐ μόνον ἐνυπάρχει ἐν τοῖς αἰσθητηρίοις ἐνεργουσῶν τῶν αἰσθήσεων, ἀλλὰ καὶ ἀπελθουσῶν.

Παραπλήσιον γὰρ τὸ πάθος ἐπὶ τε τούτων καὶ

ON DREAMS, I.—II.

case opinion states that what is seen is false, as happens with those awake, in the other opinion is fettered, and follows the mental picture.

Now it is clear that the experience which we call dreaming is not proper to the part of us which is forming an opinion, nor to the part which thinks. Nor does it entirely belong to the feeling part ; for in that case a man (in a dream) would merely see and hear. But we must consider how and in what way this comes about. Let us first lay down what is quite obvious, that it is an experience of the sensitive faculty just as sleep is ; for we do not find that sleep is the characteristic of one living creature and dreaming of another, but both are found in the same animal. But when we discussed imagination in the treatise *On the Soul*,^a it was agreed that the faculty forming mental pictures was the same as the sensitive faculty, but that the imaginative and sensitive were different in essence. Imagination was agreed to be a movement produced by perception in a state of activity, and the dream seems to be some sort of mental picture (for we call a mental picture appearing in sleep a dream, either simply so, or at any rate in some sense) ; it is clear that dreaming belongs to the sensitive faculty and is related to it in the same way as imagination.

It is closely connected with imagination.

II. What a dream is and how it originates, we can best study from the circumstances which attend sleep. For sensible objects produce sensation in us according to each sense organ, and the affection produced by them not only exists in the sense organs while the senses are in active operation, but continues after these have gone.

The affection in these cases seems to be similar to

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ἐπὶ τῶν φερομένων ἔοικεν εἶναι. καὶ γὰρ ἐπὶ τῶν
 30 φερομένων τοῦ κινήσαντος οὐκέτι θιγγάνοντος
 κινεῖται· τὸ γὰρ κινήσαν ἐκίνησεν ἄερα τινά, καὶ
 πάλιν οὗτος κινούμενος ἕτερον. καὶ τοῦτον δὴ
 τὸν τρόπον, ἕως ἂν στή, ποιεῖται τὴν κίνησιν καὶ

459 b ἐν ἀέρι καὶ ἐν τοῖς ὑγροῖς.

Ὅμοίως δ' ὑπολαβεῖν τοῦτο δεῖ καὶ ἐπ' ἁλ-
 λωίωσεως· τὸ γὰρ θερμανθὲν ὑπὸ τοῦ θερμοῦ τὸ
 πλησίον θερμαίνει, καὶ τοῦτο διαδίδωσιν ἕως τῆς
 ἀρχῆς, ὥστε καὶ ἐν ᾧ τὸ αἰσθάνεσθαι, ἐπειδὴ ἐστὶν
 5 ἀλλοιώσις τις ἢ κατ' ἐνέργειαν αἴσθησις, ἀνάγκη
 τοῦτο συμβαίνειν. διὸ τὸ πάθος ἐστὶν οὐ μόνον
 ἐν αἰσθανομένοις τοῖς αἰσθητηρίοις, ἀλλὰ καὶ ἐν
 πεπαυμένοις, καὶ ἐν βάθει καὶ ἐπιπολῆς. φανερόν
 δ' ὅταν συνεχῶς αἰσθανώμεθά τι· μεταφερόντων
 γὰρ τὴν αἴσθησιν ἀκολουθεῖ τὸ πάθος, οἷον ἐκ
 10 τοῦ ἡλίου εἰς τὸ σκότος· συμβαίνει γὰρ μηδὲν ὄραν
 διὰ τὴν ἔτι ὑποῦσαν κίνησιν ἐν τοῖς ὄμμασιν ὑπὸ
 τοῦ φωτός. καὶ πρὸς ἐν χρῶμα πολὺν χρόνον
 βλέψωμεν ἢ λευκὸν ἢ χλωρόν, τοιοῦτον φαίνεται
 ἐφ' ὅπερ ἂν τὴν ὄψιν μεταβάλλωμεν. καὶ πρὸς
 τὸν ἡλίον βλέψαντες ἢ ἄλλο τι λαμπρὸν μύσωμεν,
 15 παρατηρήσασι φαίνεται κατ' εὐθυωρίαν, ἥ συμ-
 βαίνει τὴν ὄψιν ὄραν, πρῶτον μὲν τοιοῦτον τὴν
 χροάν, εἰτα μεταβάλλει εἰς φοινικοῦν καῖπειτα
 πορφυροῦν, ἕως ἂν εἰς τὴν μέλαιναν ἔλθῃ χροάν
 καὶ ἀφανισθῇ. καὶ αἱ ἀπὸ τῶν κινουμένων δὲ
 μεταβάλλουσιν, οἷον ἀπὸ τῶν ποταμῶν, μάλιστα
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ON DREAMS, II.

that observable in projectiles. For in the case of the latter movement continues after the cause of the movement has ceased to touch them ; for the initial cause of the movement imparts motion to a portion of the air which, being moved, again moves another portion. This is the way in which the initial cause of movements continues to produce it both in air and in liquids, until the moving objects come to a standstill.

A mechanical impulse produces an effect which continues after the original impulse has ceased.

One can suppose that something similar takes place in change of state as well ; for that which is heated by the hot in turn heats that which is near it, and this hands on the succession until it reaches the beginning again. So in the case of sensation, since sensation in active operation is a kind of change of state, this must also happen. Consequently this affection exists not merely in the sense organs while they are feeling, but also when they have ceased to do so, both deep down and on the surface. This is clear when we are engaged in continuous perception ; for even when we change our sensation the affection persists ; for instance, when we turn from sunlight to darkness ; the result is that we see nothing because the movement produced in our eyes by the light still persists. Again if we look for a long time at one colour—say white or green—any object to which we shift our gaze appears to be that colour. And if, after looking at the sun or some other bright object, we shut our eyes, then, if we watch carefully, we shall still see it in the same straight line as we saw it before, first of all with its own proper colour, then it will change to red, and this to purple, until it fades to black and disappears. The same persistence of vision occurs when we turn from moving objects—for instance with rivers, and this is most conspicuous when the

So too with heat

and light.

459 b

20 δ' ἀπὸ τῶν τάχιστα ρεόντων· φαίνεται γὰρ τὰ ἡρεμοῦντα κινούμενα. γίνονται δὲ καὶ ἀπὸ τῶν μεγάλων ψόφων δύσκωφοι καὶ ἀπὸ τῶν ἰσχυρῶν ὁσμῶν δύσοσμοι, καὶ ἐπὶ τῶν ὁμοίων. ταῦτά γε δὴ φανερώς συμβαίνει τοῦτον τὸν τρόπον.

ἽΟτι δὲ ταχὺ τὰ αἰσθητήρια καὶ μικρὰς διαφορὰς αἰσθάνεται, σημεῖον τὸ ἐπὶ τῶν ἐνόπτρων γινόμενον· περὶ οὗ καὶ αὐτοῦ ἐπιστήσας σκέψαιτό τις ἂν καὶ ἀπορήσειεν. ἅμα δ' ἐξ αὐτοῦ δῆλον ὅτι ὥσπερ καὶ ἡ ὄψις πάσχει, οὕτω καὶ ποιεῖ τι. ἐν γὰρ τοῖς ἐνόπτροις τοῖς σφόδρα καθαροῖς, ὅταν τῶν καταμηνίων ταῖς γυναιξὶ γινομένων ἐμ-

30 βλέψωσιν εἰς τὸ κάτοπτρον, γίνεται τὸ ἐπιπολῆς τοῦ ἐνόπτρου οἷον νεφέλη αἱματώδης· καὶ μὲν καινὸν ἢ τὸ κάτοπτρον, οὐ ράδιον ἐκμάξαι τὴν τοιαύτην κηλῖδα, ἔαν δὲ παλαιόν, ῥᾶον. αἴτιον δ',

480 a ὥσπερ εἶπομεν, ὅτι οὐ μόνον πάσχει τι ἡ ὄψις ὑπὸ τοῦ ἀέρος, ἀλλὰ καὶ ποιεῖ τι καὶ κινεῖ, ὥσπερ καὶ τὰ λαμπρά· καὶ γὰρ ἡ ὄψις τῶν λαμπρῶν καὶ ἐχόντων χρῶμα. τὰ μὲν οὖν ὄμματα εὐλόγως,

5 ὅταν ἢ τὰ καταμήνια, διάκειται, ὥσπερ καὶ ἕτερον μέρος ὁτιοῦν· καὶ γὰρ φύσει τυγχάνουσι φλεβώδεις ὄντες. διὸ γινομένων τῶν καταμηνίων διὰ ταραχὴν καὶ φλεγμασίαν αἱματικὴν ἡμῖν μὲν ἢ ἐν τοῖς ὄμμασι διαφορὰ ἀδηλος, ἔνεστι δέ (ἢ γὰρ αὐτῇ φύσει σπέρματος καὶ καταμηνίων), ὃ δ' ἀήρ

10 κινεῖται ὑπ' αὐτῶν, καὶ τὸν ἐπὶ τῶν κατόπτρων ἀέρα συνεχῇ ὄντα ποιόν τινα ποιεῖ καὶ τοιοῦτον οἷον αὐτὸς πάσχει· ὃ δὲ τοῦ κατόπτρου τὴν ἐπιφάνειαν. ὥσπερ δὲ τῶν ἱματίων τὰ μάλιστα καθαρὰ τάχιστα κηλιδοῦται· τὸ γὰρ καθαρὸν ἀκριβῶς δηλοῖ ὅ τι ἂν δέξεται, καὶ μάλιστα τὰς ἐλα-

ON DREAMS, II.

objects move rapidly ; for then objects really at rest appear to be moving. So men become deafened by loud noises and lose their sense of smell for strong scents and so on. This obviously happens in the way described.

We can prove that the sense organs have quick perception of even small differences from what occurs with mirrors ; a subject upon which one might find considerable difficulty, if one considered it by itself. But it is quite clear that, just as vision is affected by an object, so vision produces an effect on an object. Vision affects the object seen. *Nam clarissimorum speculorum facies, cum feminae menstruâ affectae in speculum introspectant, quasi nubes sanguinea videtur : si quidem novum est speculum, macula difficilis est deletu, sin autem vetus, facilis ; propterea quod, utpote diximus, non modo oculi aere afficiuntur, sed etiam ipsi aera aliquomodo afficiunt et movent, sicut res claras ; oculi enim clara et quae colorem habent vident. Nec mirandum est oculos, cum menstrua incidunt, ita affectos esse, ut alteram partem ; ii enim natura sunt venosi. Ergo, cum menstrua incidunt feminis, oculi, scilicet turbati et inflammati, fiunt mutati (menstrua enim eandem habent naturam quam conceptio) quanquam nobis viris non apparet ; qui quidem et commovent et afficiunt si quid aeris circum speculum continetur, quod ipsum similem habet naturam ; et aer ita afficit speculi faciem. Sic etiam vestes mundissimae celerime maculantur ; tabulae enim rasae facillime im-*

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- 15 χίστας κινήσεις. ὁ δὲ χαλκὸς διὰ μὲν τὸ λεῖος εἶναι ὅποιασουσιν ἀφῆς μάλιστα αἰσθάνεται (δεῖ δὲ νοῆσαι οἶον τρίψιν οὔσαν τὴν τοῦ ἀέρος ἀφὴν καὶ ὥσπερ ἔκμαξιν καὶ ἀνάπλυσιν), διὰ δὲ τὸ καθαρὸν ἔκδηλος γίνεται ὀπηλικηοῦν οὔσα. τοῦ δὲ μὴ ἐξιέναι ταχέως ἐκ τῶν καινῶν κατόπτρων αἴτιον
- 20 τὸ καθαρὸν εἶναι καὶ λεῖον· διαδύεται γὰρ διὰ τῶν τοιούτων καὶ εἰς βάθος καὶ πάντη, διὰ μὲν τὸ καθαρὸν εἰς βάθος, διὰ δὲ τὸ λεῖον πάντη. ἐν δὲ τοῖς παλαιοῖς οὐκ ἐμμένει, ὅτι οὐχ ὁμοίως εἰσδύεται ἢ κηλὶς ἀλλ' ἐπιπολαιότερον. ὅτι μὲν οὖν καὶ ὑπὸ τῶν μικρῶν διαφορῶν γίνεται κίνησις,
- 25 καὶ ὅτι ταχεῖα ἢ αἰσθησις, ἔτι δὲ ὅτι οὐ μόνον πάσχει ἀλλὰ καὶ ἀντιποιεῖ τὸ τῶν χρωμάτων αἰσθητήριον, φανερόν ἐκ τούτων. μαρτυρεῖ δὲ τοῖς εἰρημένοις καὶ τὰ περὶ τοὺς οἶνους καὶ τὴν μυρεψίαν συμβαίνοντα. τό τε γὰρ παρασκευασθέν ἔλαιον ταχέως λαμβάνει τὰς τῶν πλησίον ὁσμάς,
- 80 καὶ οἱ οἶνοι τὸ αὐτὸ τοῦτο πάσχουσιν· οὐ γὰρ μόνον τῶν ἐμβαλλομένων ἢ ὑποκιρναμένων, ἀλλὰ καὶ τῶν πλησίον τοῖς ἀγγείοις τιθεμένων ἢ πεφυκότων ἀναλαμβάνουσι τὰς ὁσμάς.

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- Πρὸς δὲ τὴν ἐξ ἀρχῆς σκέψιν ὑποκείσθω ἐν μὲν, ὅπερ ἐκ τῶν εἰρημένων φανερόν, ὅτι καὶ ἀπελθόντος τοῦ θύραθεν αἰσθητοῦ ἐμμένει τὰ αἰσθήματα αἰσθητὰ ὄντα, πρὸς δὲ τούτοις ὅτι ῥαδίως ἀπατώμεθα περὶ τὰς αἰσθήσεις ἐν τοῖς πάθεσιν ὄντες,
- 5 ἄλλοι δ' ἐν ἄλλοις, οἶον ὁ δειλὸς ἐν φόβῳ, ὁ δ' ἐρωτικὸς ἐν ἐρωτι, ὥστε δοκεῖν ἀπὸ μικρᾶς ὁμοιότητος τὸν μὲν τοὺς πολεμίους ὄραν, τὸν δὲ τὸν ἐρώμενον· καὶ ταῦτα ὅσω ἂν ἐμπαθέστερος ᾖ, τοσοῦτ' ἀπ' ἐλάσσονος ὁμοιότητος φαίνεται. τὸν

ON DREAMS, II.

primuntur signa etiam minuta. Sed aer, quia leve est, si quis quam minime tangit, afficitur (aer autem, ut ita dicam, terere, detergere, lavare videtur), et quia mundum est, non est incertum quo modo tactum sit. Etenim, quod speculum mundum est et leve, non celeriter evanescit species; percolavit enim penitus, quia mundum est speculum, et passim diffusa est, quia leve. At in veteribus non perstat, quia macula non penitus diffusa est, sed solum in summo speculo restat. All this proves first that movement is produced by minute differences, secondly that perception is very rapid, and thirdly that the sense organ which perceives colours is not only affected by colours, but also in turn affects them. This conclusion is further supported by what occurs with wines and with the preparation of perfumes. For oil which has been prepared quickly takes on the scent of what is near it, and wines are affected in the same way; for they acquire the smell not merely of what is put into them, and mixed in small quantities with them, but even of that which is placed, or lies in vessels near by.

To return to the starting-point of our inquiry, one fact, which is clear from what we have said, may be laid down—that the object of sense still remains perceptible even after the external object perceived has gone, and moreover that we are easily deceived about our perceptions while we have them, some in some circumstances and others in others; for instance the coward in his fear, the lover in his love, so that even by a very faint resemblance the coward thinks that he sees his enemy, and the lover the object of his love; and in proportion as he is more affected, so his imagination is stimulated by a more remote

Persistence
of vision as
an explana-
tion of
dreams.

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αὐτὸν δὲ τρόπον καὶ ἐν ὀργαῖς καὶ ἐν πάσαις ἐπι-
 10 θυμίαις εὐαπάτητοι γίνονται πάντες, καὶ μᾶλλον
 ὅσω ἂν μᾶλλον ἐν τοῖς πάθεσιν ὦσιν. διὸ καὶ τοῖς
 πυρέττουσιν ἐνίστε φαίνεται ζῶα ἐν τοῖς τοίχοις
 ἀπὸ μικρᾶς ὁμοιότητος τῶν γραμμῶν συντιθεμέ-
 νων. καὶ ταῦτ' ἐνίστε συνεπιτείνει τοῖς πάθεσιν
 οὕτως ὥστ' ἐὰν μὲν μὴ σφόδρα κάμνωσι, μὴ
 15 λανθάνειν ὅτι ψεῦδος, ἐὰν δὲ μείζον ἢ τὸ πάθος,
 καὶ κινεῖσθαι πρὸς αὐτά. αἷτιον δὲ τοῦ συμβαίνειν
 ταῦτα τὸ μὴ κατὰ τὴν αὐτὴν δύναμιν κρίνειν τό-
 τε κύριον καὶ ᾧ τὰ φαντάσματα γίνεται. τούτου
 δὲ σημεῖον ὅτι φαίνεται μὲν ὁ ἥλιος ποδιαῖος,
 ἀντίφησι δὲ πολλάκις ἕτερόν τι πρὸς τὴν φαντα-
 20 σίαν. καὶ τῇ ἐπαλλάξει τῶν δακτύλων τὸ ἐν δύο
 φαίνεται, ἀλλ' ὅμως οὐ φαμεν δύο· κυριωτέρα γὰρ
 τῆς ἀφῆς ἢ ὅψις. εἰ δ' ἦν ἡ ἀφή μόνη, καὶ
 ἐκρίνομεν τὸ ἐν δύο. τοῦ δὲ διεψεῦσθαι αἷτιον
 ὅτι οὐ μόνον τοῦ αἰσθητοῦ κινουμένου φαίνεται
 ἀδήποτε, ἀλλὰ καὶ τῆς αἰσθήσεως κινουμένης αὐ-
 25 τῆς, ἐὰν ὡσαύτως κινῆται ὥσπερ καὶ ὑπὸ τοῦ
 αἰσθητοῦ· λέγω δ' οἷον ἡ γῆ δοκεῖ τοῖς πλέουσιν
 κινεῖσθαι κινουμένης τῆς ὀψεως ὑπ' ἄλλου.

III. Ἐκ δὴ τούτων φανερόν ὅτι οὐ μόνον ἐργηγορό-
 των αἰ κινήσεις αἰ ἀπὸ τῶν αἰσθημάτων γινόμεναι
 30 τῶν τε θύραθεν καὶ τῶν ἐκ τοῦ σώματος ἐνυπαρχου-
 σῶν, ἀλλὰ καὶ ὅταν γένηται τὸ πάθος τοῦτο ὃ καλεῖ-
 ται ὕπνος, καὶ μᾶλλον τότε φαίνονται. μεθ' ἡμέραν
 481 a μὲν γὰρ ἐκκρούονται ἐνεργουσῶν τῶν αἰσθήσεων

ON DREAMS, II.—III.

resemblance. In the same way in temper and in all forms of desire all are easily deceived, and the more easily, the more they are under the influence in question. So men in fever think that they see animals on the walls from the slight resemblance of lines joined to each other. Sometimes the effect on the emotions is such that, if they are not very ill, they are aware that the impression is false, but, if the malady grows worse, they are moved to believe in what they see. The reason that this occurs is that the controlling power does not judge these things by the same faculty as that by which sense images occur. This is proved by the fact that the sun appears to measure a foot across, but there is some other power which contradicts this impression. So again when the fingers are crossed one object (between them) appears to be two, but yet we deny that there are two; for sight has more authority than touch. But if touch were the only criterion, we should judge the one as two. The cause of this deception is that objects of any kind may appear to us, not only when the object of sense supplies the stimulus, but also when the sense is stimulated by itself, provided that it is stimulated in the same way as by an object of sense; I mean for instance that to those who are sailing past it the land seems to move, though really the eye is being moved by another cause.

III. It is evident from the foregoing that movements arising from the senses, both those which are stimulated from without and those which have their origin within the body, occur not only when we are awake, but also when the affection we call sleep supervenes, and even more at that time. In the daytime these movements are eclipsed when the senses

Explanations by analogy.

καὶ τῆς διανοίας, καὶ ἀφανίζονται ὥσπερ παρὰ
πολὺ πῦρ ἔλαττον καὶ λῦπαι καὶ ἡδοναὶ μικραὶ
παρὰ μεγάλας, παυσαμένων δ' ἐπιπολάζει καὶ τὰ
μικρά· νύκτωρ δὲ δι' ἀργίαν τῶν κατὰ μόριον
5 αἰσθήσεων καὶ ἀδυναμίαν τοῦ ἐνεργεῖν, διὰ τὸ ἐκ
τῶν ἔξω εἰς τὸ ἐντὸς γίνεσθαι τὴν τοῦ θερμοῦ
παλίρροιον, ἐπὶ τὴν ἀρχὴν τῆς αἰσθήσεως κατα-
φέρονται καὶ γίνονται φανεραὶ καθισταμένης τῆς
ταραχῆς. δεῖ δ' ὑπολαβεῖν ὥσπερ τὰς μικρὰς
δύνας τὰς ἐν τοῖς ποταμοῖς γινομένας, οὕτω τὴν
10 κίνησιν ἐκάστην γίνεσθαι συνεχῶς, πολλάκις μὲν
ὁμοίως, πολλάκις δὲ διαλυομένας εἰς ἄλλα σχήματα
διὰ τὴν ἀντίκρουσιν. διὸ καὶ μετὰ τὴν τροφήν
καὶ ἀμπαν νέοις οὔσιν, οἷον τοῖς παιδίοις, οὐ
γίνεται ἐνύπνια· πολλὴ γὰρ ἡ κινήσις διὰ τὴν ἀπὸ
τῆς τροφῆς θερμότητα. ὥστε καθάπερ ἐν ὑγρῷ,
15 ἂν σφόδρα κινῇ τις, ὅτε μὲν οὐδὲν φαίνεται
εἶδωλον ὅτε δὲ φαίνεται μὲν διεστραμμένον δὲ
ἀμπαν, ὥστε φαίνεσθαι ἄλλοιόν ἢ οἷόν ἐστιν,
ἡρεμήσαντος δὲ καθαρὰ καὶ φανερά, οὕτω καὶ ἐν
τῷ καθεύδειν τὰ φαντάσματα καὶ αἱ ὑπόλοιποι
κινήσεις αἱ συμβαίνουσαι ἀπὸ τῶν αἰσθημάτων
20 ὅτε μὲν ὑπὸ μείζονος οὔσης τῆς εἰρημένης κινήσεως
ἀφανίζονται ἀμπαν, ὅτε δὲ τεταραγμένα φαίνον-
ται αἱ ὅψεις καὶ τερατώδεις καὶ οὐκ ἔρρωμένα τὰ
ἐνύπνια, οἷον τοῖς μελαγχολικοῖς καὶ πυρέττουσι
καὶ οἰνωμένοις· πάντα γὰρ τὰ τοιαῦτα πάθη πνευ-
25 ματώδη ὄντα πολλὴν ποιεῖ κίνησιν καὶ ταραχὴν.
καθισταμένου δὲ καὶ διακρινομένου τοῦ αἵματος
ἐν τοῖς ἐναίμοις, σωζομένη τῶν αἰσθημάτων ἡ
κινήσις ἀφ' ἐκάστου τῶν αἰσθητηρίων ἔρρωμένα
τε ποιεῖ τὰ ἐνύπνια, καὶ φαίνεσθαί τι καὶ δοκεῖν

ON DREAMS, III.

and the mind are active, and are obscured just in the same way as a smaller fire is obscured by a greater, and small pains and pleasures by great ; but when these movements have ceased even the small ones come to the surface ; but at night, because the senses are individually at rest and cannot function, owing to the flow of heat reversing direction and passing from the outside to the inside, they reach the point where sensation begins and becomes noticeable, as the bustle subsides. One may suppose that they are like the eddies which are seen in rivers, each movement taking place continuously, often with unchanging pattern, but often again dividing into other shapes owing to some obstruction. For this reason after food and in the very young such as infants there are no dreams ; for the movement is considerable owing to the heat arising from food ; so in water if one disturbs it violently, sometimes no image appears, and sometimes it appears but is entirely distorted, so that it seems quite different from what it really is, but, when the water is still, it is clear cut and plain ; so also in sleep, some of the visions and other movements that arise from the senses are altogether obscured owing to the greater movement we have mentioned before, and sometimes the visions appear confused and monstrous, and the dreams seem not substantial, as occurs with the melancholic, the feverish and the intoxicated ; for all these affections, being due to breathing, produce much movement and confusion. In the animals that have blood, when the blood is steady and divided into its elements, the movement of the senses derived from each of the sense organs makes the dreams substantial, and the sleeper imagines that he

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διὰ μὲν τὰ ἀπὸ τῆς ὄψεως καταφερόμενα ὄραν,
διὰ δὲ τὰ ἀπὸ τῆς ἀκοῆς ἀκούειν. ὁμοιοτρόπως

80 δὲ καὶ ἀπὸ τῶν ἄλλων αἰσθητηρίων· τῷ μὲν γὰρ
ἐκείθεν ἀφικνεῖσθαι τὴν κίνησιν πρὸς τὴν ἀρχὴν

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καὶ ἐγρηγορῶς δοκεῖ ὄραν καὶ ἀκούειν καὶ αἰσθάνεσθαι, καὶ διὰ τὸ τὴν ὄψιν ἐνίοτε κινεῖσθαι δοκεῖν οὐ κινουμένην ὄραν φαμέν, καὶ τῷ τὴν ἀφῆν δύο κινήσεις εἰσαγγέλλειν τὸ ἐν δύο δοκεῖν. ὅλως

γὰρ τὸ ἀφ' ἐκάστης αἰσθήσεως φησιν ἡ ἀρχή, ἐὰν

5 μὴ ἑτέρα κυριωτέρα ἀντιφῇ. φαίνεται μὲν οὖν

πάντως, δοκεῖ δὲ οὐ πάντως τὸ φαινόμενον, ἀλλ'

ἐὰν τὸ ἐπικρῖνον κατέχεται ἢ μὴ κινῆται τὴν

οἰκείαν κίνησιν. ὥσπερ δ' εἶπομεν ὅτι ἄλλοι δι'

ἄλλο πάθος εὐαπάτητοι, οὕτως ὁ καθεύδων διὰ

τὸν ὕπνον καὶ τὸ κινεῖσθαι τὰ αἰσθητήρια καὶ

10 τὰλλα τὰ συμβαίνοντα περὶ τὴν αἴσθησιν, ὥστε

τὸ μικρὰν ἔχον ὁμοιότητα φαίνεται ἐκείνο. ὅταν

γὰρ καθεύδῃ, κατιόντος τοῦ πλείστου αἵματος ἐπὶ

τὴν ἀρχὴν συγκατέρχονται αἱ ἐνοῦσαι κινήσεις, αἱ

μὲν δυνάμει αἱ δὲ ἐνεργείᾳ. οὕτω δ' ἔχουσιν ὥστε

ἐν τῇ κινήσει τηρῶν ἡδὲ ἐπιπολάσει ἐξ αὐτοῦ ἡ

15 κίνησις, ἃν δ' αὕτη φθαρῇ, ἡδε. καὶ πρὸς ἀλλήλας

δ' ἔχουσιν ὥσπερ οἱ πεπλασμένοι βάτραχοι οἱ

ἀνιόντες ἐν τῷ ὕδατι τηκομένου τοῦ ἀλός. οὕτως

ἐνεῖσι δυνάμει, ἀνειμένου δὲ τοῦ κωλύοντος ἐνεργοῦσιν· καὶ λυόμεναι ἐν ὀλίγῳ τῷ λοιπῷ αἵματι

τῷ ἐν τοῖς αἰσθητηρίοις κινεῖνται, ἔχουσαι ὁμοιό-

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really sees what is carried down by the sense of vision, and that he hears what is carried down by the sense of hearing. The same is true of the other sense organs. Even in the waking state a man's impression that he sees, hears or feels is due to the fact that the movement passes from there to the starting-point ; and because the vision seems at times to be stimulated, though really it is not, we say that we see, and one appears to be two, because the sense of touch reports two stimuli. For, speaking generally, the controlling power affirms the report given by each sense, unless another power still more authoritative contradicts it. In every case the sense impression is there, but the sense impression does not in every case seem true, but only when the judging faculty is subordinated, and is not moving with its proper movement. But just as we have said that some are liable to be deceived by one affection and others by another, so the sleeper is liable to be deceived owing to his sleep, and to the fact that the sense organs and the other things which are connected with sensation are stimulated so that an image which has only a remote resemblance seems to be the object itself. For when a man is asleep, most of the blood sinks to its source, and the movements residing in it, some potential and some actual, travel with it. They are in such a condition, that in this movement one will detach itself and rise to the surface, and if this is destroyed another will do so. Their relation to each other is similar to that of artificial frogs, which rise to the surface of the water, as the salt is dissolved. They thus exist potentially, but only function actually when the preventing cause is removed ; and travelling in the little blood which remains in the sense organs they

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²⁰ τητα ὥσπερ τὰ ἐν τοῖς νέφεσιν, ἃ παρεικάζουσιν ἀνθρώποις καὶ κενταύροις ταχέως μεταβάλλοντα. τούτων δὲ ἕκαστόν ἐστιν, ὥσπερ εἴρηται, ὑπόλειμμα τοῦ ἐν τῇ ἐνεργείᾳ αἰσθήματος· καὶ ἀπελθόντος τοῦ αἰσθήματος τοῦ ἀληθοῦς ἔνεστι, καὶ ἀληθὲς εἰπεῖν ὅτι τοιοῦτον οἶον Κορίσκος, ἀλλ' οὐ Κορί-

²⁵ σκος. ὅτε δ' ἠσθάνετο, οὐκ ἔλεγε Κορίσκον τὸ κύριον καὶ τὸ ἐπικρῖνον, ἀλλὰ διὰ τοῦτο ἐκείνον Κορίσκον τὸν ἀληθινόν. οὗ δὴ καὶ αἰσθανόμενον λέγει τοῦτο, ἐὰν μὴ παντελῶς κατέχεται ὑπὸ τοῦ αἵματος, ὥσπερ μὴ αἰσθανόμενον τοῦτο, κινεῖται ὑπὸ τῶν κινήσεων τῶν ἐν τοῖς αἰσθητηρίοις. καὶ

³⁰ δοκεῖ τὸ ὁμοιον αὐτὸ εἶναι ἀληθές. καὶ τοσαύτη τοῦ ὕπνου ἢ δύναμις ὥστε ποιεῖν τοῦτο λανθάνειν. ὥσπερ οὖν εἴ τινα λανθάνοι ὑποβαλλόμενος ὁ

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δάκτυλος τῷ ὀφθαλμῷ, οὐ μόνον φανεῖται ἀλλὰ καὶ δόξει εἶναι δύο τὸ ἓν, ἂν δὲ μὴ λανθάνῃ, φανεῖται μὲν οὐ δόξει δέ, οὕτω καὶ ἐν τοῖς ὕπνοις, ἐὰν μὲν αἰσθάνηται ὅτι καθεύδει, καὶ τοῦ πάθους ἐν ᾧ ἢ αἴσθησις τοῦ ὑπνωτικοῦ, φαίνεται μὲν, ⁵ λέγει δέ τι ἐν αὐτῷ ὅτι φαίνεται μὲν Κορίσκος, οὐκ ἔστι δὲ Κορίσκος (πολλάκις γὰρ καθεύδοντας λέγει τι ἐν τῇ ψυχῇ ὅτι ἐνύπνιον τὸ φαινόμενον)· ἐὰν δὲ λανθάνῃ ὅτι καθεύδει, οὐδὲν ἀντίφησι τῇ φαντασίᾳ.

Ὅτι δ' ἀληθῆ λέγομεν καὶ εἰς κινήσεις φανταστικάς ἐν τοῖς αἰσθητηρίοις, δῆλον, ἐάν τις προσ- ¹⁰ ἔχων πειρᾶται μνημονεύειν ἃ πάσχομεν καταφερόμενοί τε καὶ ἐγειρόμενοι· ἐνίοτε γὰρ τὰ φαινόμενα

ON DREAMS, III.

move, having resemblance in the same way as clouds, which at times are like men, and then with a rapid change are like centaurs. Each of these, as has been said, is what is left of the actual impression ; though the real impression has gone, this still remains, and it is true to say that it is for instance like Coriscus, though it is not Coriscus. When perception was actually taking place the controlling and discriminating sense did not declare it Coriscus, but by this controlling sense said that the genuine Coriscus was that man yonder. That which when actually perceiving it declared to be this, unless entirely controlled by the blood, it now calls it when not actually perceiving it, being stirred by the movements which exist in the sense organs. And so what resembles it seems to be the genuine thing. And the power of sleep is such that it makes one unaware of this. If a man is unaware that a finger is being pressed below his eye, one will not merely seem two, but will carry conviction that it is so, whereas, if he is not unaware, one will still appear two, but will not carry conviction that it is so. Just in the same way in sleep, if a man is aware that he is asleep, and of the condition of a sleeping man's perception, the appearance is there, but he says within himself that there is the appearance of Coriscus, but it is not really Coriscus (for often when a man is asleep he says somewhere in his soul that what appears to him is a dream) ; but if he is unaware that he is asleep there is nothing to contradict the mental picture.

It becomes quite clear that our account is true, and that there are imaginative stimuli in the sense organs, if one tries to remember how we are affected when dropping off to sleep and waking up ; for sometimes

Residual
images in
the sense
organs.

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εἶδωλα καθεύδοντι φωράσει ἐγειρόμενος κινήσεις
οὐσας ἐν τοῖς αἰσθητηρίοις· ἐνίοις γὰρ τῶν νεωτέ-
ρων καὶ πάμπαν διαβλέπουσιν, ἐὰν ᾗ σκότος, φαί-
νεται εἶδωλα πολλὰ κινούμενα, ὥστ' ἐγκαλύπτεσθαι
15 πολλάκις φοβουμένους.

Ἐκ δὴ τούτων ἀπάντων δεῖ συλλογίσασθαι ὅτι
ἐστὶ τὸ ἐνύπνιον φάντασμα μὲν τι καὶ ἐν ὕπνῳ·
τὰ γὰρ ἄρτι λεχθέντα εἶδωλα οὐκ ἔστιν ἐνύπνια,
οὐδ' εἴ τι ἄλλο λελυμένων τῶν αἰσθήσεων φαίνεται·
οὐδὲ τὸ ἐν ὕπνῳ φάντασμα πᾶν. πρῶτον μὲν γὰρ
20 ἐνίοις συμβαίνει καὶ αἰσθάνεσθαι πῃ καὶ ψόφων καὶ
φωτὸς καὶ χυμοῦ καὶ ἀφῆς, ἀσθενικῶς μέντοι
καὶ οἷον πόρρωθεν· ἤδη γὰρ ἐν τῷ καθεύδειν
ὑποβλέποντες, ὃ ἡρέμα ἐώρων φῶς τοῦ λύχνου
καθεύδοντες, ὡς ὦντο, ἐπεγερθέντες εὐθύς ἐγνώ-
ρισαν τὸ τοῦ λύχνου ὄν, καὶ ἀλεκτρυόνων καὶ
25 κυνῶν φωνὴν ἡρέμα ἀκούοντες ἐγερθέντες σαφῶς
ἐγνώρισαν. ἐνιοὶ δὲ καὶ ἀποκρίνονται ἐρωτώμενοι·
ἐνδέχεται γὰρ τοῦ ἐγρηγορέναι καὶ καθεύδειν ἀπλῶς
θατέρου ὑπάρχοντος θατερόν πῃ ὑπάρχειν. ὦν
οὐδὲν ἐνύπνιον φατέον. οὐδ' ὅσαι δὴ ἐν τῷ ὕπνῳ
γίνονται ἀληθεῖς ἔννοιαι παρὰ τὰ φαντάσματα.
30 ἀλλὰ τὸ φάντασμα τὸ ἀπὸ τῆς κινήσεως τῶν
αἰσθημάτων, ὅταν ἐν τῷ καθεύδειν ᾗ, ᾗ καθεύδει,
τοῦτ' ἐστὶν ἐνύπνιον.

Ἦδη δέ τισι συμβέβηκεν ὥστε μηδὲν ἐνύπνιον
ἐωρακέναι κατὰ τὸν βίον. σπάνιον μὲν οὖν τὸ
482 b τοιοῦτόν ἐστι, συμβαίνει δ' ὁμως. καὶ τοῖς μὲν
ὅλως διετέλεσεν, ἐνίοις δὲ καὶ προελθοῦσι πόρρω
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ON DREAMS, III.

images which appear to one when asleep one will on waking detect to be movements in the sense organs : for to some young people even when their eyes are wide open, if it is dark, many images seem to move, so that they often cover their heads in fright.

One must conclude from all this that a dream is one form of mental image, which occurs in sleep : for the images just referred to are not dreams, nor any other image which appears when the senses are relaxed ; nor is every mental picture occurring in sleep a dream. For in the first place some have a certain perception of sounds, and light, and flavour, and touch, but faintly and, as it were, from a distance : for seeing vaguely in their sleep the light of the lamp, as they supposed, which they saw but faintly, they instantly recognize when fairly awake to be really the light of the lamp, and similarly hearing faintly the cocks crowing, or the dogs barking, they recognize them definitely when fully awake. Some (sleepers) again even answer when they are asked a question ; for it is quite possible, in the case of being awake and asleep, that when one is present the other is also in a certain sense. But none of these things can be called a dream. Nor can those real thoughts which occur in sleep in connexion with mental pictures. But the mental picture which arises from the movement of the senses when one is asleep, in so far as this condition exists, is a dream.

But it has been the lot of some that they have never seen a dream throughout their life. Such a condition is uncommon, but nevertheless it occurs. With some the condition lasts all through their lives, but with others dreams come to them when they are far ad-

Dreams and true perception in sleep.

Dreamers.

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τῆς ἡλικίας ἐγένετο, πρότερον οὐδὲν ἐνύπνιον ἑωρα-
 κόσιν. τὸ δ' αἴτιον τοῦ μὴ γίνεσθαι παραπλήσιόν
 τι δεῖ νομίζειν, ὅτι οὐδὲ μετὰ τὴν τροφήν καθ-
 5 υπνώσασιν οὐδὲ τοῖς παιδίοις γίνεται ἐνύπνιον·
 ὅσοις γὰρ τοῦτον τὸν τρόπον συνέστηκεν ἡ φύσις
 ὥστε πολλὴν προσπίπτειν ἀναθυμίασιν πρὸς τὸν
 ἄνω τόπον, ἥ πάλιν καταφερομένη ποιεῖ πλῆθος
 κινήσεως, εὐλόγως τούτοις οὐδὲν φαίνεται φάν-
 τασμα. προϋούσης δὲ τῆς ἡλικίας οὐδὲν ἄτοπον
 10 φανῆναι ἐνύπνιον· μεταβολῆς γάρ τινος γενομένης
 ἢ καθ' ἡλικίαν ἢ κατὰ πάθος ἀναγκαῖον συμβῆναι
 τὴν ἐναντίωσιν ταύτην.

ON DREAMS, III.

vanced in life, never having seen one before. One must suppose that the reason of its not occurring is the same as that which accounts for dreams not appearing to those who sleep after food, nor to children. For those whose nature is so constituted that much upward evaporation takes place, which when it descends again produces a considerable movement, naturally see no mental picture. But it is not surprising that dreams appear as their age advances; for an opposite reaction must occur when a change takes place due to either age or illness.

ON PROPHECY IN SLEEP

INTRODUCTION

THE most astonishing thing about this short treatise is the purely modern scientific attitude which Aristotle adopts. All antiquity regarded dreams as analogous to demoniac possession, and therefore to be treated with reverence, and to a great extent worthy of trust. Aristotle prefaces his tract by suggesting that it is wrong either to reject or credulously accept the statement that dreams are of divine origin. He dismisses the majority of dreams as mere coincidences, and in this sense, outside causation ; but he clearly thinks that there is a residue which is capable of explanation, but only by a skilled interpreter.

ΠΕΡΙ ΤΗΣ ΚΑΘ' ΥΠΝΟΝ ΜΑΝΤΙΚΗΣ

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Ι. Περὶ δὲ τῆς μαντικῆς τῆς ἐν τοῖς ὕπνοις γινο-
μένης καὶ λεγομένης συμβαίνειν ἀπὸ τῶν ἐνυπνίων,
οὔτε καταφρονῆσαι ῥάδιον οὔτε πεισθῆναι. τὸ μὲν
15 γὰρ πάντας ἢ πολλοὺς ὑπολαμβάνειν ἔχειν τι
σημειῶδες τὰ ἐνύπνια παρέχεται πίστιν ὥς ἐξ
ἐμπειρίας λεγόμενον, καὶ τὸ περὶ ἐνίων εἶναι τὴν
μαντικὴν ἐν τοῖς ἐνυπνίοις οὐκ ἄπιστον· ἔχει γάρ
τινα λόγον, διὸ καὶ περὶ τῶν ἄλλων ἐνυπνίων
ὁμοίως ἂν τις οἰηθείη. τὸ δὲ μηδεμίαν αἰτίαν
20 εὖλογον ὁρᾶν, καθ' ἣν ἂν γίνοιτο, τοῦτο διαπιστεῖν
ποιεῖ· τό τε γὰρ θεὸν εἶναι τὸν πέμποντα, πρὸς
τῇ ἄλλῃ ἀλογία, καὶ τὸ μὴ τοῖς βελτίστοις καὶ
φρονιμωτάτοις ἀλλὰ τοῖς τυχοῦσι πέμπειν ἄτοπον.
ἀφαιρεθείσης δὲ τῆς ἀπὸ τοῦ θεοῦ αἰτίας οὐδεμία
τῶν ἄλλων εὖλογος εἶναι φαίνεται αἰτία· τὸ γὰρ
25 περὶ τῶν ἐφ' Ἡρακλείαις στήλαις ἢ τῶν ἐν
Βορυσθένει προορᾶν τινάς, ὑπὲρ τὴν ἡμετέραν εἶναι
δόξειεν ἂν σύνεσιν εὑρεῖν τούτων τὴν ἀρχήν.^ο

Ἀνάγκη δ' οὖν τὰ ἐνύπνια ἢ αἷτια εἶναι ἢ σημεῖα
τῶν γιγνομένων ἢ συμπτώματα, ἢ πάντα ἢ ἓνα
τούτων ἢ ἓν μόνον. λέγω δ' αἷτιον μὲν οἶον τὴν

ON PROPHECY IN SLEEP

I. As for prophecy which takes place in sleep and which is said to arise from dreams, it is not a simple matter either to be contemptuous, or to be convinced. The fact that all, or at least many, suppose that dreams have a significance inclines one to believe, as the opinion is quoted as the result of experience, nor is it incredible that on some subjects there should be divination in dreams ; for it has some show of reason, and therefore one might suppose it true of other dreams as well. But the fact that one can see no reasonable cause why it should be so, makes one distrust it ; the idea that it is God who sends it, apart from its improbability on other grounds, is strange, especially as it does not come to the best and wisest, but to any chance persons. But, if we dismiss the theory that it comes from God, there seems no other probable explanation left ; for it seems beyond our understanding to find any reason why anyone should foresee things occurring at the Pillars of Heracles or on the Borysthenes.

Dreams must however be either the causes or signs of events which occur, or else coincidences, either all these, or some, or one only. By the word

The possibility of belief in dreams as sent from God.

Are they significant or mere coincidences ?

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30 σελήνην τοῦ ἐκλείπειν τὸν ἥλιον καὶ τὸν κόπον τοῦ πυρετοῦ, σημεῖον δὲ τῆς ἐκλείψεως τὸ τὸν ἀστέρα εἰσελθεῖν, τὴν δὲ τραχύτητα τῆς γλώττης τοῦ πυρέττειν, σύμπτωμα δὲ τὸ βαδίζοντος ἐκλείπειν
 463 a τὸν ἥλιον· οὔτε γὰρ σημεῖον τοῦ ἐκλείπειν τοῦτ' ἐστὶν οὔτ' αἴτιον, οὔθ' ἡ ἐκκλιψις τοῦ βαδίζειν. διὸ τῶν συμπτωμάτων οὐδὲν οὔτ' αἶε γίνεται οὔθ' ὥς ἐπὶ τὸ πολὺ. ἄρ' οὖν ἐστὶ τῶν ἐνυπνίων τὰ μὲν αἵτια, τὰ δὲ σημεῖα, οἷον τῶν περὶ τὸ σῶμα
 5 συμβαινόντων; λέγουσι γοῦν καὶ τῶν ἱατρῶν οἱ χαριέντες ὅτι δεῖ σφόδρα προσέχειν τοῖς ἐνυπνίοις· εὐλογον δ' οὕτως ὑπολαβεῖν καὶ τοῖς μὴ τεχνίταις μὲν, σκοποῦμένοις δέ τι καὶ φιλοσοφοῦσιν.

Λί γὰρ μεθ' ἡμέραν γινόμεναι κινήσεις, ἂν μὴ σφόδρα μεγάλα ὦσι καὶ ἰσχυραί, λανθάνουσι παρὰ
 10 μείζους τὰς ἐγρηγορικὰς κινήσεις. ἐν δὲ τῷ καθεύδειν τὸναντίον· καὶ γὰρ αἱ μικραὶ μεγάλαι δοκοῦσιν εἶναι. δῆλον δ' ἐπὶ τῶν συμβαινόντων κατὰ τοὺς ὕπνους πολλάκις· οἷοντα γὰρ κεραυνοῦσθαι καὶ βροντᾶσθαι μικρῶν ἤχων ἐν τοῖς ὥσι γινομένων, καὶ μέλιτος καὶ γλυκέων χυμῶν ἀπο-
 15 λαύειν ἀκαριαίου φλέγματος καταρρέοντος, καὶ βαδίζειν διὰ πυρὸς καὶ θερμαίνεσθαι σφόδρα μικρᾶς θερμασίας περὶ τινα μέρη γιγνομένης. ἐπεγειρομένοις δὲ ταῦτα φανερά τοῦτον ἔχοντα τὸν τρόπον. ὥστ' ἐπεὶ μικραὶ πάντων αἱ ἀρχαί, δῆλον ὅτι καὶ τῶν νόσων καὶ τῶν ἄλλων παθημάτων τῶν ἐν τοῖς
 20 σώμασι μελλόντων γίνεσθαι. φανερόν οὖν ὅτι ταῦτα ἀναγκαῖον ἐν τοῖς ὕπνοις εἶναι καταφανῆ μαλλον ἢ ἐν τῷ ἐγρηγορεῖναι.

ON PROPHECY IN SLEEP, 1.

cause I mean in the sense in which the moon is the cause of an eclipse of the sun, or fatigue is the cause of fever ; the fact that a star enters our vision I call significant of the eclipse ; the roughness of the tongue is significant of fever, but the fact that someone is walking when the sun is eclipsed is a coincidence. For this is neither the cause of, nor significant of the eclipse, any more than the eclipse is the cause or significant of a man walking. So no coincidence occurs invariably or even commonly. Is it true then that some dreams are causes and others significant—of what happens in the body for instance ? Even accomplished physicians say that close attention should be paid to dreams ; and it is natural for those to suppose so, who are not skilled, but who are inquirers and lovers of truth.

Impulses occurring in the daytime, if they are not very great and powerful, pass unnoticed because of greater waking impulses. But in the time of sleep the opposite takes place ; for then small impulses seem to be great. This is clear from what often happens in sleep ; men think that it is lightning and thundering, when there are only faint echoes in their ears, and that they are enjoying honey and sweet flavours, when only a drop of phlegm is slipping down (their throats), and that they are walking through fire and are tremendously hot, when there is only a slight heating about certain parts. The true nature of these becomes obvious when they wake up. Since the beginnings of all things are small, obviously the beginnings of diseases and other distempers, which are about to visit the body, must also be small. These then must be more evident in the sleeping than in the waking state.

Distortion
by dreams.

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Ἀλλὰ μὴν καὶ ἑνία γε τῶν καθ' ὕπνον φαντασμάτων αἷτια εἶναι τῶν οἰκείων ἐκάστω πράξεων οὐκ ἄλογον· ὥσπερ γὰρ μέλλοντες πράττειν καὶ ἐν ταῖς
 25 πράξεσιν ὄντες ἢ πεπραχότες πολλάκις εὐθυνοειρία τούτοις σύνεσμεν καὶ πράττομεν (αἷτιον δ' ὅτι προωδοποιημένη τυγχάνει ἢ κίνησις ἀπὸ τῶν μεθ' ἡμέραν ἀρχῶν), οὕτω πάλιν ἀναγκαῖον καὶ τὰς καθ' ὕπνον κινήσεις πολλάκις ἀρχὴν εἶναι τῶν μεθ' ἡμέραν πράξεων διὰ τὸ προωδοποιηθῆσαι πάλιν καὶ
 80 τούτων τὴν διάνοιαν ἐν τοῖς φαντάσμασι τοῖς νυκτερινοῖς. οὕτω μὲν οὖν ἐνδέχεται τῶν ἐνυπνίων ἑνία καὶ σημεία καὶ αἷτια εἶναι.

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Τὰ δὲ πολλὰ συμπτώμασιν ἔοικε, μάλιστα δὲ τὰ τε ὑπερβατὰ πάντα καὶ ὧν μὴ ἐν αὐτοῖς ἢ ἀρχὴ οἶον¹ περὶ ναυμαχίας καὶ τῶν πόρρω συμβαινόντων ἐστίν· περὶ γὰρ τούτων τὸν αὐτὸν τρόπον ἔχειν εἰκὸς οἶον ὅταν μεμνημένῳ τινὶ περὶ τινος τύχῃ
 5 τοῦτο γινόμενον· τί γὰρ κωλύει καὶ ἐν τοῖς ὕπνοις οὕτως; μᾶλλον δ' εἰκὸς πολλὰ τοιαῦτα συμβαίνειν. ὥσπερ οὖν οὐδὲ τὸ μνησθῆναι περὶ τοῦδε σημείου οὐδ' αἷτιον τοῦ παραγενέσθαι αὐτόν, οὕτως οὐδ' ἐκεῖ τοῦ ἀποβῆναι τὸ ἐνύπνιον τῷ ἰδόντι οὔτε σημεῖον οὔτ' αἷτιον, ἀλλὰ σύμπτωμα. διὸ καὶ
 10 πολλὰ τῶν ἐνυπνίων οὐκ ἀποβαίνει· τὰ γὰρ συμπτώματα οὗτ' αἰεὶ οὔθ' ὥς ἐπὶ τὸ πολὺ γίνεται.

II. "Ὅλως δ' ἐπεὶ καὶ τῶν ἄλλων ζώων ὀνειρώττει τινά, θεόπεμπτα μὲν οὐκ ἂν εἴη τὰ ἐνύπνια, οὐδὲ γέγονε τούτου χάριν, δαιμόνια μέντοι· ἢ γὰρ
 15 φύσις δαιμονία, ἀλλ' οὐ θεία. σημεῖον δέ· πάνν

¹ ἀλλὰ B.

ON PROPHECY IN SLEEP, I.—II.

Again it is not unreasonable to suppose that some of the mental pictures which appear in sleep are the causes of the actions associated with them ; for just when you are going to act, or are engaged in some action, or have already completed it, you are often connected with this act and perform it in a vivid dream (the reason being that the impulse arising from the first cause in the daytime has paved the way for it), so conversely impulses in sleep must often be the first cause of actions in the daytime, because the way has been paved for the intention to do these actions in dreams at night. In this way then it is possible for some dreams to be both significant and causes.

They may
cause
action.

But most of them resemble coincidences, especially those which are extravagant, and which cannot initiate any action, but deal for instance with naval battles and far-off events ; in these cases it seems likely that the process is much the same, as when a man remembers a thing by chance and it occurs. Is there anything to prevent this occurring in sleep ? On the contrary, probably many dreams of this kind occur. Just as recollection was neither significant nor the cause of a man's appearing, so in our case the fact of the dream appearing to the man who saw it was neither significant, nor the cause, but only a coincidence. Consequently not many results come from dreams ; for coincidences do not occur invariably or even generally.

Some
dreams are
certainly co-
incidences.

II. Generally speaking, seeing that some of the lower animals also dream, dreams cannot be sent by God, nor is this the cause of their appearance, but they are miraculous ; for human nature is miraculous, though it is not divine. There is proof of this ; for

Normally
dreams are
not of
divine
origin.

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γὰρ εὐτελεῖς ἄνθρωποι προορατικοί εἰσι καὶ εὐθυ-
 όνειροι, ὡς οὐ θεοῦ πέμποντος, ἀλλ' ὅσων ὥσπερ ἂν
 εἰ λάλος ἡ φύσις ἐστὶ καὶ μελαγχολική, παντοδαπὰς
 ὄψεις ὁρῶσιν· διὰ γὰρ τὸ πολλὰ καὶ παντοδαπὰ
 κινεῖσθαι ἐπιτυγχάνουσιν ὁμοίοις θεωρήμασιν, ἐπι-
 20 τυχεῖς ὄντες ἐν τούτοις ὥσπερ ἔνιοι ἀρτιάζοντες¹.
 ὥσπερ γὰρ καὶ λέγεται " ἂν πολλὰ βάλλῃς, ἄλλοτ'
 ἀλλοῖον βαλεῖς " καὶ ἐπὶ τούτων τοῦτο συμβαίνει.

"Ὅτι δ' οὐκ ἀποβαίνει πολλὰ τῶν ἐνυπνίων, οὐδὲν
 ἄτοπον· οὐδὲ γὰρ τῶν ἐν τοῖς σώμασι σημείων καὶ
 τῶν οὐρανίων, οἷον τὰ τῶν ὑδάτων καὶ τὰ τῶν
 25 πνευμάτων· ἂν γὰρ ἄλλη κυριωτέρα ταύτης συμβῇ
 κίνησις, ἀφ' ἧς μελλούσης ἐγένετο τὸ σημεῖον, οὐ
 γίνεται. καὶ πολλὰ βουλευθέντα καλῶς τῶν πραχ-
 θῆναι δεόντων διελύθη δι' ἄλλας κυριωτέρας ἀρχάς.
 ὅλως γὰρ οὐ πᾶν γίνεται τὸ μελλήσαν, οὐδὲ ταῦτό
 30 τὸ ἐσόμενον καὶ τὸ μέλλον· ἀλλ' ὅμως ἀρχὰς τε
 λεκτέον εἶναι, ἀφ' ὧν οὐκ ἐπετελέσθη, καὶ σημεία
 πέφυκε ταῦτα τινῶν οὐ γενομένων.

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Περὶ δὲ τῶν μὴ τοιαύτας ἐχόντων ἀρχὰς ἐνυπνίων
 οἷας εἵπομεν, ἀλλ' ὑπερορίας ἢ τοῖς χρόνοις ἢ τοῖς
 τόποις ἢ τοῖς μεγέθεσιν, ἢ τούτων μὲν μηδέν, μὴ
 μέντοι γε ἐν αὐτοῖς ἐχόντων τὰς ἀρχὰς τῶν ἰδόντων
 τὸ ἐνύπνιον, εἰ μὴ γίνεται τὸ προορᾶν ἀπὸ συμπτώ-
 5 ματος, τοιόνδ' ἂν εἴη μᾶλλον ἢ ὥσπερ λέγει Δη-
 μόκριτος εἰδῶλα καὶ ἀπορροίας αἰτιώμενος. ὥσπερ
 γὰρ ὅταν κινήσῃ τι τὸ ὕδωρ ἢ τὸν ἀέρα, τοῦθ'
 ἕτερον ἐκίνησε, καὶ παυσαμένου ἐκείνου συμβαίνει

¹ ἀρτια μερίζοντες B.

ON PROPHECY IN SLEEP, II.

some inferior men have prophetic and vivid dreams, so they cannot be sent by God; but men whose nature is garrulous or melancholic see all kinds of visions; because they respond often to any kind of stimulus, they chance upon visions similar to these, lighting upon them in the same way as some men playing odd and even, for as the saying goes: If you cast a die many times you will be sure to cast differently at some time. In the case we are discussing the same thing happens.

But it is in no way surprising that no results follow many dreams; for they do not always follow bodily and heavenly symptoms, as we see in the case of rain and wind; for if another impulse supervenes more powerful than that from which in the future the symptoms arise, there is no result from it. Many things that require doing, though excellently planned, fail owing to more powerful causes. Speaking quite generally not all probabilities occur, nor is that which shall be the same as that which is likely to be; but all the same we must call these beginnings from which no result ensues, and there are genuine symptoms of some things which do not happen.

But dreams which have not beginnings of the kind we have described, but are outside possibility either in time, or place, or size, or they may be none of these but yet of the kind, the beginnings of which those who see the dream cannot control, unless the prediction is purely a coincidence, such dreams seem to have the following explanation rather than that given by Democritus, who attributes them to images and emanations. When anything stirs water or air, this in its turn causes movement, and when the first impulse has ceased, a similar movement still con-

Sometimes
no result
occurs.

Why dreams
come to men
of inferior
intelligence.

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- τὴν τοιαύτην κίνησιν προΐέναι μέχρι τινός, τοῦ κινήσαντος οὐ παρόντος, οὕτως οὐδὲν κωλύει
 10 κινήσιν τινα καὶ αἰσθῆσιν ἀφικνεῖσθαι πρὸς τὰς ψυχὰς τὰς ἐνυπνιαζούσας, ἀφ' ὧν ἐκεῖνος τὰ εἶδωλα ποιεῖ καὶ τὰς ἀπορροίας, καὶ ὅπῃ δὴ ἔτυχεν ἀφικνου-
 μένας μᾶλλον αἰσθητὰς εἶναι νύκτωρ διὰ τὸ μεθ' ἡμέραν φερομένας διαλύεσθαι μᾶλλον (ἀταραχω-
 15 δέστερος γὰρ ὁ ἀὴρ τῆς νυκτός διὰ τὸ νηνεμωτέρας εἶναι τὰς νύκτας), καὶ ἐν τῷ σώματι ποιεῖν αἰσθῆσιν διὰ τὸν ὕπνον, διὰ τὸ καὶ τῶν μικρῶν κινήσεων τῶν ἐντὸς αἰσθάνεσθαι καθεύδοντας μᾶλλον ἢ ἐγρηγο-
 ρότας. αὐταὶ δ' αἱ κινήσεις φαντάσματα ποιοῦσιν, ἐξ ὧν προορῶσι τὰ μέλλοντα περὶ τῶν τοιούτων.
 20 καὶ διὰ ταῦτα συμβαίνει τὸ πάθος τοῦτο τοῖς τυχοῦσι καὶ οὐ τοῖς φρονιμωτάτοις. μεθ' ἡμέραν τε γὰρ ἐγίγνετ' ἂν καὶ τοῖς σοφοῖς, εἰ θεὸς ἦν ὁ πέμπων· οὕτω δ' εἰκὸς τοὺς τυχόντας προορᾶν· ἡ γὰρ διάνοια τῶν τοιούτων οὐ φροντιστικὴ ἀλλ' ὥσπερ ἔρημος καὶ κενὴ πάντων, καὶ κινηθεῖσα κατὰ τὸ κινοῦν ἄγεται.
 25 Καὶ τοῦ ἐνίου τῶν ἐκστατικῶν προορᾶν αἴτιον ὅτι αἱ οἰκεῖαι κινήσεις οὐκ ἐνοχλοῦσιν ἀλλ' ἀπορραπίζονται· τῶν ξενικῶν οὖν μάλιστα αἰσθάνονται. τὸ δέ τινας εὐθυονεῖρους εἶναι καὶ τὸ τοὺς γνωρί-
 μους περὶ τῶν γνωρίμων μάλιστα προορᾶν συμβαίνει διὰ τὸ μάλιστα τοὺς γνωρίμους ὑπὲρ ἀλλήλων
 30 φροντίζειν· ὥσπερ γὰρ πόρρω ὄντων μάλιστα¹ γνωρίζουσι καὶ αἰσθάνονται, οὕτω καὶ τῶν κινήσεων· αἱ γὰρ τῶν γνωρίμων γνωριμώτεραι κινήσεις. οἱ δὲ μελαγχολικοὶ διὰ τὸ σφόδρα, ὥσπερ βάλλοντες

¹ τάχιστα B.

ON PROPHECY IN SLEEP, II.

tinues up to a point, though the first impulse is over ; just in the same way there is nothing to prevent some movement and perception coming to souls that are asleep, from which Democritus constructs his images and emanations, and however it happens they are more easily perceived by night, because in the daytime they are apt to be borne away and dissipated (for the air is less disturbed at night because the nights are calmer), and they cause sensation in the body owing to sleep, because men are more conscious of small internal movements when asleep than when awake. But these impulses produce mental pictures, from which men predict what will happen about such things. This is why this affection occurs more readily to ordinary men, and not to those who are specially intelligent. If it were God that sent them they would appear by day also, and to the wise ; but, as it is, it is natural that ordinary men should foresee ; for the minds of such men are not given to deep thought, but are empty and vacant of all thoughts, and when once stimulated follow the impulse.

The reason why some whose minds are unstable foresee, is that their own mental impulses do not occlude others, but are driven off by them. So they are most sensitive to outside impulses. For some cases of vivid dreams there are special explanations : for instance when men have visions about their friends, it is because those who are great friends think a good deal about each other : for just as they perceive and recognize each other most often at a distance, so it acts with impulses ; for the impulses of well-known friends are themselves more well known. The melancholic, because of their intense

Some
dreams have
special
causes.

484 b πόρρωθεν, εὖστοχοί εἰσιν. καὶ διὰ τὸ μεταβλητικὸν
 ταχὺ τὸ ἐχόμενον φαντάζεται αὐτοῖς· ὥσπερ γὰρ
 τὰ Φιλαιγίδου ποιήματα καὶ οἱ ἔμμανεῖς ἐχόμενα
 τοῦ ὁμοίου λέγουσι καὶ διανοοῦνται, οἷον Ἀφροδί-
 την, καὶ οὕτω συνείρουσιν εἰς τὸ πρόσω. ἔτι δὲ διὰ
 δ τὴν σφοδρότητα οὐκ ἐκκρούεται αὐτῶν ἢ κίνησις
 ὑφ' ἐτέρας κινήσεως.

Τεχνικώτατος δ' ἐστὶ κριτῆς ἐνυπνίων ὅστις
 δύναται τὰς ὁμοιότητας θεωρεῖν· τὰς γὰρ εὐθυ-
 νονειρίας κρίνειν παντός ἐστιν. λέγω δὲ τὰς ὁμοιό-
 τητας, ὅτι παραπλήσια συμβαίνει τὰ φαντάσματα τοῖς
 10 ἐν τοῖς ὕδασι εἰδώλοις, καθάπερ καὶ πρότερον
 εἵπομεν. ἐκεῖ δέ, ἂν πολλὴ γίνηται ἢ κίνησις,
 οὐδὲν ὁμοία γίνεται ἢ ἔμφασις καὶ τὰ εἰδῶλα τοῖς
 ἀληθινοῖς. δεινὸς δὴ τὰς ἐμφάσεις κρίνειν εἴη ἂν
 ὁ δυνάμενος ταχὺ διαισθάνεσθαι καὶ συννοῶν τὰ
 διαπεφορημένα καὶ διεστραμμένα τῶν εἰδώλων, ὅτι
 15 ἐστὶν ἀνθρώπου ἢ ἵππου ἢ ὅτουδήποτε. καὶ ἐκεῖ δὴ
 ὁμοίως τι δύναται τὸ ἐνύπνιον τοῦτο· ἢ γὰρ κίνησις
 ἐκκόπτει τὴν εὐθυνονειρίαν. τί μὲν οὖν ἐστὶν ὕπνος
 καὶ ἐνύπνιον, καὶ διὰ τίν' αἰτίαν ἐκάτερον αὐτῶν
 γίνεται, ἔτι δὲ περὶ τῆς ἐκ τῶν ἐνυπνίων μαντικῆς
 εἴρηται.

ON PROPHECY IN SLEEP, II.

feelings, are (to use a metaphor) good at aiming, as if they were shooting from a distance. And because of their liability to change, the next picture in the series comes rapidly before them ; just as even the insane recite and con over the poems of Philaegidas, such as the Aphrodite, because the ideas are all associated ; so the melancholic pursue a series. Also owing to their intense feeling the one impulse is not violently displaced by another.

But the most skilful judge of dreams is the man who possesses the ability to detect likenesses ; for anyone can judge the vivid dream. By likenesses I mean that the mental pictures are like reflections in water, as we have said before. If there is much movement, the reflection is not like the original, nor the image like the real. Now the man would be indeed a clever interpreter of dreams who could quickly discriminate, and make these scattered and distorted images into a complete picture of a man, say, or a horse or any other object. Now the dream has a somewhat similar power ; for movement destroys the vivid dream. We have then explained what sleep and dreams are, why each of them occurs and also about prophecy from dreams.

Special
powers
necessary
to explain
dreams.

ON LENGTH AND
SHORTNESS OF LIFE

INTRODUCTION

ARISTOTLE here attempts to decide what factors contribute to short and long life in the animal and plant. He is concerned with the normal life only, quite apart from short life due either to disease or accident.

He first determines a number of conditions which do not affect the question, such as climate, size and so on, and then appears to conclude that the determining factors are warmth and moisture. It does not seem to have occurred to him that as a general rule the longer an organic structure takes to develop, the longer it survives without decay.

In the latter part of this treatise a similar principle is applied. Youth and life are naturally associated with warmth, old age and death with cold. Aristotle therefore concludes that warmth and cold are the causes of the respective states.

There is not very much in this essay to help the modern reader, but it will be noticed that the treatment is almost entirely physiological; the philosophical side of these questions is neglected.

ΠΕΡΙ ΜΑΚΡΟΒΙΟΤΗΤΟΣ ΚΑΙ ΒΡΑΧΥΒΙΟΤΗΤΟΣ

464 b

Ι. Περὶ δὲ τοῦ τὰ μὲν εἶναι μακρόβια τῶν ζώων
20 τὰ δὲ βραχύβια, καὶ περὶ ζωῆς ὅλως μήκους καὶ
βραχύτητος ἐπισκεπτέον τὰς αἰτίας. ἀρχὴ δὲ τῆς
σκέψεως ἀναγκαία πρῶτον ἐκ τοῦ διαπορῆσαι περὶ
αὐτῶν. οὐ γάρ ἐστι δῆλον πότερον ἕτερον ἢ τὸ
αὐτὸ αἴτιον πᾶσι τοῖς ζώοις καὶ φυτοῖς τοῦ τὰ μὲν
25 εἶναι μακρόβια τὰ δὲ βραχύβια· καὶ γὰρ τῶν φυτῶν
τὰ μὲν ἐπέτειον τὰ δὲ πολυχρόνιον ἔχει τὴν ζωὴν.
ἔτι δὲ πότερον ταῦτα μακρόβια καὶ τὴν φύσιν
ὑγιεινὰ τῶν φύσει συνεστῶτων, ἢ κεχώρισται καὶ
τὸ βραχύβιον καὶ τὸ νοσῶδες, ἢ κατ' ἐνίας μὲν
νόσους ἐπαλλάττει τὰ νοσῶδη τὴν φύσιν σώματα
80 τοῖς βραχυβίοις, κατ' ἐνίας δ' οὐδὲν κωλύει νοσῶ-
δεις εἶναι μακροβίους ὄντας.

Περὶ μὲν οὖν ὕπνου καὶ ἐγρηγόρσεως εἴρηται
πρότερον, περὶ δὲ ζωῆς καὶ θανάτου λεκτέον
ὑστερον, ὁμοίως δὲ καὶ περὶ νόσου καὶ ὑγείας,
465 a ὅσον ἐπιβάλλει τῇ φυσικῇ φιλοσοφίᾳ· νῦν δὲ περὶ
τῆς αἰτίας τοῦ τὰ μὲν εἶναι μακρόβια τὰ δὲ βραχύ-
βια, καθάπερ εἴρηται πρότερον, θεωρητέον. ἔστι
δ' ἔχοντα τὴν διαφορὰν ταύτην ὅλα τε πρὸς ὅλα

ON LENGTH AND SHORTNESS OF LIFE

I. Our task is now to consider the reasons why some living creatures are long-lived and others short-lived, and generally to inquire into length and shortness of life. The necessary starting-point of our inquiry is the difficulties that arise on the subject. For it is not clear whether the reason why some animals and plants are long-lived, and others short-lived, is the same in all cases or different. For some plants last only for one year, while others live for a long time. Secondly, are longevity and good health the same thing in the case of all natural structures, or are short life and disease unconnected, or again in some diseases do disease and short life go together, while in others there is nothing to prevent the diseased from being also long-lived ?

Connexion
between
health and
longevity.

We have previously discussed sleep and the waking state, and later on we must speak of life and death, and similarly of disease and health, as far as they contribute to physical philosophy. But our present inquiry is concerned with the reasons why some living things live long, and some are short-lived. Now different genera exhibit differences, and also we find

Generic and
specific
differences.

485 a

γένη, καὶ τῶν ὑφ' ἐν εἶδος ἕτερα πρὸς ἕτερα. λέγω
 5 δὲ κατὰ γένος μὲν διαφέρειν οἷον ἄνθρωπον πρὸς
 ἵππον (μακροβιώτερον γὰρ τὸ τῶν ἀνθρώπων γένος
 ἢ τὸ τῶν ἵππων), κατ' εἶδος δ' ἄνθρωπον πρὸς
 ἄνθρωπον· εἰσὶ γὰρ καὶ ἄνθρωποι οἱ μὲν μακρόβιοι
 οἱ δὲ βραχύβιοι ἕτεροι καθ' ἑτέρους τόπους διεστῶ-
 10 τες· τὰ μὲν γὰρ ἐν τοῖς θερμοῖς τῶν ἐθνῶν μακρο-
 βιώτερα, τὰ δ' ἐν τοῖς ψυχροῖς βραχυβιώτερα.
 καὶ τῶν τὸν αὐτὸν δὲ τόπον οἰκούντων διαφέρουσιν
 ὁμοίως τινὲς ταύτην πρὸς ἀλλήλους τὴν διαφοράν.

II. Δεῖ δὴ λαβεῖν τί τὸ εὐφθαρτον ἐν τοῖς φύσει
 συνεστῶσι καὶ τί τὸ οὐκ εὐφθαρτον. πῦρ γὰρ καὶ
 15 ὕδωρ καὶ τὰ τοῦτοις συγγενῇ, οὐκ ἔχοντα τὴν
 αὐτὴν δύναμιν, τυγχάνει γενέσεως καὶ φθορᾶς
 αἷτια ἀλλήλοις, ὥστε καὶ τῶν ἄλλων ἕκαστον ἐκ
 τούτων ὄντα καὶ συνεστῶτα μετέχειν τῆς τούτων
 φύσεως εὐλογον, ὅσα μὴ συνθέσει ἐκ πολλῶν ἐστίν,
 οἷον οἰκία. περὶ μὲν οὖν τῶν ἄλλων ἕτερος λόγος·
 20 εἰσὶ γὰρ ἴδιαι φθοραὶ πολλοῖς τῶν ὄντων, οἷον
 ἐπιστήμη καὶ ὑγιεία καὶ νόσῳ· ταῦτα γὰρ φθεῖρεται
 καὶ μὴ φθειρομένων τῶν δεκτικῶν ἀλλὰ σωζομένων,
 οἷον ἀγνοίας μὲν φθορὰ ἀνάμνησις καὶ μάθησις,
 ἐπιστήμης δὲ λήθη καὶ ἀπάτη. κατὰ συμβεβηκὸς
 25 δ' ἀκολουθοῦσι τοῖς φυσικοῖς αἱ τῶν ἄλλων φθοραὶ·
 φθειρομένων γὰρ τῶν ζώων φθεῖρεται καὶ ἡ ἐπι-
 στήμη καὶ ἡ ὑγίεια ἡ ἐν τοῖς ζώοις.

Διὸ καὶ περὶ ψυχῆς συλλογίσαιτ' ἂν τις ἐκ τού-
 των· εἰ γὰρ ἐστὶ μὴ φύσει ἀλλ' ὥσπερ ἐπιστήμη ἐν
 ψυχῇ, οὕτω καὶ ψυχὴ ἐν σώματι, εἴη ἂν τις αὐτῆς
 390

ON LENGTH OF LIFE, I.—II.

differences between individuals included under one species. By differences in genus I mean for instance between man to horse (for the genus man is longer-lived than the genus horse), and by specific difference I mean between man and man ; for some men are long-lived, and some short-lived, varying in different places ; for races living in hot countries live longer than those in cold countries. Some also living in the same place exhibit the same differences among themselves.

II. We must of course consider why among natural objects one is easily destroyed and another is not. For fire, water and other elements akin to them, but not having the same power, are mutually the cause of each other's birth and destruction, so that it is only natural that anything proceeding from or composed of these elements should share in a like character, except for those things which are composed of many elements, such as a house. With regard to all other things it is a different question ; for many existing things such as knowledge and health have their own peculiar sources of destruction ; for these can be destroyed even when what contains them is not destroyed, but continues to exist : for instance learning and recollection destroy ignorance, and forgetfulness and deception destroy knowledge. But the fact that the destruction of other things follows the destruction of natural objects is only accidental, for when living creatures are destroyed, the knowledge and health that is in them are destroyed also.

From these facts one might come to some conclusion about the soul, for if the soul is not by its own nature contained in a body, but only in the way in which knowledge is contained in the soul, it might be

The sources
of destruction.

Soul and
body.

485 a

³⁰ καὶ ἄλλη φθορὰ παρὰ τὴν φθορὰν ἣν φθείρεται
φθειρομένου τοῦ σώματος. ὥστ' ἐπεὶ οὐ φαίνεται
τοιαύτη οὕσα, ἄλλως ἂν ἔχοι πρὸς τὴν τοῦ σώματος
κοινωνίαν.

485 b

III. Ἴσως δ' ἂν τις ἀπορήσειεν εὐλόγως, ἄρ'
ἔστιν οὐ ἀφθαρτον ἔσται τὸ φθαρτόν, οἷον τὸ πῦρ
ἄνω, οὐ μή ἐστι τὸ ἐναντίον. φθείρεται γὰρ τὰ
μὲν ὑπάρχοντα τοῖς ἐναντίοις κατὰ συμβεβηκός,
⁵ τῷ ἐκεῖνα φθείρεσθαι· ἀναιρεῖται γὰρ τὰναντία ὑπ'
ἀλλήλων· κατὰ συμβεβηκός δ' οὐθὲν τῶν ἐν ταῖς
οὐσίαις ἐναντίων φθείρεται, διὰ τὸ μηθενὸς ὑπο-
κειμένου κατηγορεῖσθαι τὴν οὐσίαν. ὥσθ' ὥ μή
ἔστιν ἐναντίον καὶ ὅπου μή ἐστιν, ἀδύνατον ἂν εἴη
φθαρῆναι· τί γὰρ ἔσται τὸ φθεροῦν, εἴπερ ὑπ' ἐν-
¹⁰ ἀντίων μὲν φθείρεσθαι συμβαίνει μόνων, τοῦτο δὲ
μὴ ὑπάρχει, ἢ ὅλως ἢ ἐνταῦθα; ἢ τοῦτο τῇ μὲν
ἀληθές ἐστι τῇ δ' οὐ· ἀδύνατον γὰρ τῷ ὕλην ἔχοντι
μὴ ὑπάρχειν πως τὸ ἐναντίον. πάντα μὲν γὰρ
ἐνεῖναι τὸ θερμὸν ἢ τὸ εὐθὺ ἐνδέχεται, πᾶν δ' εἶναι
ἀδύνατον ἢ θερμὸν ἢ εὐθὺ ἢ λευκόν· ἔσται γὰρ τὰ
¹⁵ πάθη κεχωρισμένα. εἰ οὖν, ὅταν ἅμα ἢ τὸ ποιη-
τικὸν καὶ τὸ παθητικόν, αἰεὶ τὸ μὲν ποιεῖ τὸ δὲ
πάσχει, ἀδύνατον μὴ μεταβάλλειν. ἔτι καὶ εἰ
ἀνάγκη περίττωμα ποιεῖν, τὸ δὲ περίττωμα ἐν-
αντίον· ἐξ ἐναντίου γὰρ αἰεὶ ἢ μεταβολή, τὸ δὲ
περίττωμα ὑπόλειμμα τοῦ προτέρου. εἰ δὲ πᾶν
²⁰ ἐξελαύνει τὸ ἐνεργεῖα ἐναντίον, καὶ ἐνταῦθ' ἄ-
392

ON LENGTH OF LIFE, II.—III.

liable to some other form of destruction beyond that which overtakes it when the body is damaged. Since this is evidently not the case, the association of the soul with the body cannot be like that of knowledge within the soul.

III. A question may here be raised whether there is any place in which the destructible is not destroyed, as is the case with fire in the upper regions, where no opposite exists. For attributes belonging to opposites are destroyed only incidentally, because the opposites in question are destroyed ; for opposites are removed by each other ; but none of the opposites which exist in substances is destroyed incidentally, because substance cannot be an attribute of any subject. It would therefore be impossible for anything to be destroyed which has no opposite, or where its opposite does not exist. For what would there be to destroy it, if things can only be destroyed by their opposites, and if such an opposite does not exist either at all, or at that particular place ? Perhaps this statement is partly true and partly untrue ; for everything which possesses matter must have an opposite in some sense. Qualities such as heat or straightness may exist in any substance, but no substance can consist solely of heat, straightness or whiteness ; for in that case affections could exist in isolation. If then, whenever what acts and what is acted upon exist together, one acts and the other is acted upon, it is impossible that there should be no change. Further if it is necessary that a surplus should be produced, then this surplus is an opposite ; for all change is produced by an opposite, and the surplus is what is left over from the former state. If then all active opposites are driven out, there we should have indestructibility. But yet this

is inde-
structibility
impossible

465 b

φθαρτον ἂν εἴη. ἢ οὐ, ἀλλ' ὑπὸ τοῦ περιέχοντος
φθείρεται.

Εἰ μὲν οὖν ἰκανόν, ἐκ τῶν εἰρημένων· εἰ δὲ μή,
ὑποθέσθαι δεῖ ὅτι ἔνεστί τι ἐνεργεία ἐναντίον, καὶ
περίττωμα γίνεται. διὸ ἡ ἐλάττων φλόξ κατακάε-
ται ὑπὸ τῆς πολλῆς κατὰ συμβεβηκός, ὅτι ἡ τροφή
25 ἦν ἐκείνη ἐν πολλῷ χρόνῳ ἀναλίσκει τὸν καπνόν,
ταύτην ἡ πολλὴ φλόξ ταχύ. διὸ πάντα αἰεὶ ἐν
κινήσει ἐστί, καὶ γίνεται ἢ φθείρεται. τὸ δὲ περι-
έχον ἢ συμπράττει ἢ ἀντιπράττει. καὶ διὰ τοῦτο
μετατιθέμενα πολυχρονιώτερα μὲν γίνεται καὶ
ὀλιγοχρονιώτερα τῆς φύσεως, αἰδία δ' οὐδαμοῦ,
80 ὅσοις ἐναντία ἐστίν· εὐθύς γὰρ ἡ ὕλη τὸ ἐναντίον
ἔχει. ὥστ' εἰ μὲν τοῦ ποῦ, κατὰ τόπον μεταβάλλει,
εἰ δὲ τοῦ ποσοῦ, κατ' αὐξήσιν καὶ φθίσιν· εἰ δὲ
πάθους, ἀλλοιοῦται.

466 a

IV. Ἔστι δ' οὔτε τὰ μέγιστα ἀφθαρτότερα
(ἵππος γὰρ ἀνθρώπου βραχυβιώτερον) οὔτε τὰ
μικρά (ἐπέτεια γὰρ τὰ πολλὰ τῶν ἐντόμων) οὔτε
τὰ φυτὰ ὅλως τῶν ζώων (ἐπέτεια γὰρ ἔνια τῶν
5 φυτῶν) οὔτε τὰ ἔναιμα (μέλιττα γὰρ πολυχρονιώ-
τερον ἐνίων ἐναίμων) οὔτε τὰ ἄναιμα (τὰ γὰρ
μαλάκια ἐπέτεια μὲν, ἄναιμα δέ) οὔτε τὰ ἐν τῇ γῇ
(καὶ γὰρ φυτὰ ἐπέτεια ἐστί καὶ ζῶα πεζά) οὔτε
τὰ ἐν τῇ θαλάττῃ (καὶ γὰρ ἐκεῖ βραχύβια καὶ τὰ
ὀστρακηρὰ καὶ τὰ μαλάκια). ὅλως δὲ τὰ μακρο-
10 βιώτατα ἐν τοῖς φυτοῖς ἐστίν, οἷον ὁ φοῖνιξ· εἴτ'
394

ON LENGTH OF LIFE, III.—IV.

would not be the case ; it would be destroyed by its own envelope.

If we have argued the point sufficiently, then it may stand according to what we have said ; but if not, one must assume that there is some active opposite, and that a surplus arises. So the lesser flame is consumed by the greater incidentally, because the nourishment—namely the smoke—which the lesser flame exhausts after a long time, is exhausted rapidly by the greater. So everything is in a state of movement, and is either being born, or is being destroyed. Its envelope either works with it or against it. Changing as everything does for this reason, things may be longer or shorter lived than their own nature allows, but in no case can they be everlasting, if they have opposites ; for their matter at once has an opposite. So that if there is an opposite in position, the change is one of locality, if of quantity, the change takes place by growth and decay ; if the opposite is an affection, a change of state results.

Nothing
can last
for ever.

IV. Large things as a class are not less liable to destruction (for a horse does not live as long as a man), nor are small things (for most of the insects only live a year), nor the plants as a whole less than the animals (for some plants are annuals), nor those having blood (for the bee lives longer than some full-blooded animals), nor the bloodless (for the mollusca, which are bloodless, only live for a year), nor land creatures (for there are plants and land animals which only live for a year), nor marine creatures (for in the sea the testacea and mollusca are both short-lived). Generally speaking the longest lived are to be found among plants, *e.g.* the date-palm ; secondly, longevity is

How far is
longevity
dependent
on size?

486 a

ἐν τοῖς ἐναίμοις ζώοις μᾶλλον ἢ ἐν τοῖς ἀναίμοις,
καὶ ἐν τοῖς πεζοῖς ἢ ἐν τοῖς ἐνύδροις. ὥστε καὶ
συνδυασθέντων ἐν τοῖς ἐναίμοις καὶ πεζοῖς τὰ
μακροβιώτατα τῶν ζώων ἐστίν, οἷον ἄνθρωπος καὶ
ἐλέφας. καὶ δὴ καὶ τὰ μείζω ὥς ἐπὶ τὸ πολὺ
15 εἰπεῖν τῶν ἐλαττόνων μακροβιώτερα· καὶ γὰρ καὶ
τοῖς ἄλλοις συμβέβηκε τοῖς μακροβιωτάτοις μέγε-
θος, ὥσπερ καὶ τοῖς εἰρημένοις.

V. Τὴν δ' αἰτίαν περὶ τούτων ἀπάντων ἐντεύθεν
ἂν τις θεωρήσειεν. δεῖ γὰρ λαβεῖν ὅτι τὸ ζῶον
ἐστὶ φύσει ὑγρὸν καὶ θερμόν, καὶ τὸ ζῆν τοιοῦτον,
20 τὸ δὲ γῆρας ψυχρόν καὶ ξηρόν, καὶ τὸ τεθνηκός·
φαίνεται γὰρ οὕτως. ὕλη δὲ τῶν σωμάτων τοῖς
οὔσι ταῦτα, τὸ θερμόν καὶ τὸ ψυχρόν, καὶ τὸ ξηρόν
καὶ τὸ ὑγρόν. ἀνάγκη τοίνυν γηράσκοντα ξηραί-
νεσθαι. διὸ δεῖ μὴ εὐξήραντον εἶναι τὸ ὑγρόν. καὶ
διὰ τοῦτο τὰ λιπαρὰ ἄσηπτα. αἷτιον δ' ὅτι αἶρος·
25 ὃ δ' ἀῆρ πρὸς τὰλλα πῦρ· πῦρ δ' οὐ γίνεται σαπρόν.
οὐδ' αὖ ὀλίγον δεῖ εἶναι τὸ ὑγρόν· εὐξήραντον γὰρ
καὶ τὸ ὀλίγον. διὸ καὶ τὰ μεγάλα καὶ ζῶα καὶ
φυτὰ ὥς ὅλως εἰπεῖν μακροβιώτερα, καθάπερ
ἐλέχθη πρότερον· εὐλογον γὰρ τὰ μείζω πλέον
ἔχειν ὑγρόν. οὐ μόνον δὲ διὰ τοῦτο μακροβιώτερα·
30 δύο γὰρ τὰ αἷτια, τό τε ποσὸν καὶ τὸ ποιόν, ὥστε
δεῖ μὴ μόνον πλήθος εἶναι ὑγροῦ, ἀλλὰ τοῦτο καὶ
θερμόν, ἵνα μήτε εὐπηκτον μήτε εὐξήραντον ᾗ.
καὶ διὰ τοῦτο ἄνθρωπος μακρόβιον μᾶλλον ἐνίων
μειζόνων· μακροβιώτερα γὰρ τὰ λειπόμενα τῷ
486 b πλήθει τοῦ ὑγροῦ, ἐὰν πλείονι λόγῳ ὑπερέχῃ κατὰ
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ON LENGTH OF LIFE, IV.—V.

commoner among the animals with blood than among those without, and among land animals rather than water animals. Coupling together the two qualities of having blood and living on land, the longest lived of all creatures are the man and the elephant. Speaking generally the larger animals are longer lived than the smaller. For size will be found to belong to the other very long-lived creatures as it does to the two we have mentioned.

V. One might suggest reasons for all these facts as follows. One must admit that the living creature is naturally moist and warm, and that life too is of this nature, whereas old age is cold and dry, and so is a dead body. This is obvious. Now the matter of which bodies are composed among the living consists of hot and cold, dry and moist. But as they grow old they must dry up. So the moist must not be easily dried. For this reason oily things are less liable to decay. The reason for this is that they contain air; and air bears the same relation to the other elements as fire does; and fire is not liable to decay. Nor must the moisture exist in small quantity; for a small quantity is easily dried. For this reason the large creatures—both animals and plants—are generally speaking longer lived, as has been said above; for the larger animal naturally contains more moisture. But this is not the only reason for their greater longevity; there are two causes, quantity and quality, so that the moisture must not only be present in quantity, but this must also be hot, in order that it may not easily be either frozen or dried. This is why man is longer lived than some larger creatures; for those creatures with a smaller quantity of moisture will be longer lived if their excess in

Heat and
moisture
as factors
in the
problem.

τὸ ποιὸν ἢ λείπεται κατὰ τὸ ποσόν. ἔστι δ' ἐνίοις μὲν τὸ θερμὸν τὸ λιπαρόν, ὃ ἅμα ποιεῖ τό τε μὴ εὐξήραντον καὶ τὸ μὴ εὐψυκτον· ἐνίοις δ' ἄλλον ἔχει χυμόν.

- 5 "Ἐτι δεῖ τὸ μέλλον εἶναι μὴ εὐφθαρτον μὴ περιττωματικὸν εἶναι. ἀναιρεῖ γὰρ τὸ τοιοῦτον ἢ νόσῳ ἢ φύσει· ἐναντία δ' ἡ τοῦ περιττώματος δύναμις καὶ φθαρτικὴ ἢ μὲν τῆς φύσεως ἢ δὲ μορίου. διὸ τὰ ὀχευτικά καὶ πολὺσπερμα γηράσκει ταχύ· τὸ γὰρ σπέρμα περίττωμα, καὶ ἔτι ξηραίνει ἀπίον.
- 10 καὶ διὰ τοῦτο ἡμίονος μακροβιώτερος ἵππου καὶ ὄνου, ἐξ ὧν ἐγένετο, καὶ τὰ θήλεα τῶν ἀρρένων, εἰς ὀχευτικά ἢ τὰ ἄρρενα· διὸ οἱ στρουθοὶ οἱ ἄρρενες βραχυβιώτεροι τῶν θηλειῶν. ἔτι δὲ καὶ ὅσα πονητικά τῶν ἀρρένων, καὶ διὰ τὸν πόνον γηράσκει μᾶλλον· ξηραίνει γὰρ ὁ πόνος, τὸ δὲ γῆρας ξηρόν
- 15 ἔστιν. φύσει δὲ καὶ ὥς ἐπὶ τὸ πᾶν εἰπεῖν τὰ ἄρρενα τῶν θηλειῶν μακροβιώτερα· αἴτιον δ' ὅτι θερμότερον ζῶον τὸ ἄρρεν ἔστι τοῦ θήλεος. τὰ δ' αὐτὰ ἐν τοῖς ἀλεινοῖς μακροβιώτερά ἐστιν ἢ ἐν τοῖς ψυχροῖς τόποις, διὰ τὴν αὐτὴν αἰτίαν δι' ἣν περ τὰ μείζω. καὶ μάλιστα ἐπίδηλον τὸ μέγεθος τῶν τὴν
- 20 φύσιν ψυχρῶν ζώων· διὸ οἱ τ' ὄφεις καὶ αἱ σαῦραι καὶ τὰ φολιδωτὰ μεγάλα ἐν τοῖς θερμοῖς τόποις, καὶ ἐν τῇ θαλάττῃ τῇ ἐρυθρᾷ τὰ ὀστρακόδερμα· τῆς τε γὰρ αὐξήσεως ἢ θερμῇ ὑγρότης αἰτία καὶ τῆς ζωῆς. ἐν δὲ τοῖς ψυχροῖς τόποις ὑδατωδέστερον τὸ ὑγρὸν τὸ ἐν τοῖς ζώοις ἐστίν· διὸ εὐπηκτον, ὥστε
- 25 τὰ μὲν οὐ γίνεται ὅλως τῶν ζώων τῶν ὀλιγαίμων ἢ ἀναίμων ἐν τοῖς πρὸς τὴν ἄρκτον τόποις (οὔτε τὰ πεζὰ ἐν τῇ γῇ οὔτε τὰ ἐνυδρὰ ἐν τῇ θαλάττῃ), τὰ

ON LENGTH OF LIFE, v.

quality is greater than their defect in quantity. In some again the heat is of a fatty nature, which makes it neither so easily dried nor so easily chilled ; and in others again it has some other flavour.

Moreover that which is intended to resist destruction must not have great waste products. For this produces death either by disease or by nature ; for the power of such waste products is destructive sometimes of the natural life, at other times of part of it. For this reason animals that are salacious and have much seed age quickly ; for the seed is a waste product, and when it goes dryness ensues. This is why the mule is longer lived than the horse and the ass, from which it is born, and the female generally is longer lived than the male, if the male is salacious ; so also the male sparrow lives a shorter time than the female. Further this is true of all males that work hard, and grow old more rapidly because of their toil ; for toil produces dryness, and old age is dry. But naturally, speaking quite generally, the male lives longer than the female ; the reason being that the male is a warmer creature than the female. Animals too are longer lived in hot countries than in cold, for the same reason as that which makes the larger animals longer lived. The size of animals which are naturally cold is quite obvious ; so snakes, lizards, and animals with horny scales are large in hot countries, and so with the crustacea in the Red Sea ; for a warm moisture is the cause of growth as well as of life. But in cold countries the moisture in animals is more watery ; consequently it congeals easily, so that in the northern climes either the animals of little or no blood do not occur at all (neither the animals with feet on land, nor water creatures in the sea), or

466 b

δὲ γίνεται μὲν, ἐλάττω δὲ καὶ βραχυβιώτερα· ἀφαιρεῖται γὰρ ὁ πάγος τὴν αὔξησιν.

Τροφὴν δὲ μὴ λαμβάνοντα καὶ τὰ φυτὰ καὶ τὰ
 80 ζῶα φθείρονται· συνιτῇκει γὰρ αὐτὰ ἑαυτά· ὥσπερ
 γὰρ ἡ πολλὴ φλόξ κατακαίει καὶ φθείρει τὴν ὀλίγην
 τῷ τὴν τροφὴν ἀναλίσκειν, οὕτω τὸ φυσικὸν θερμὸν
 τὸ πρῶτον πεπτικὸν ἀναλίσκει τὴν ὕλην ἐν ᾗ ἐστίν.
 τὰ δ' ἐνυδρα τῶν πεζῶν ἥττον μακρόβια οὐχ ὅτι
 467 a ὑγρὰ ἀπλῶς, ἀλλ' ὅτι ὑδατώδη· τὸ δὲ τοιοῦτον
 ὑγρὸν εὐφθαρτον, ὅτι ψυχρὸν καὶ εὐπηκτον. καὶ
 τὸ ἀναιμον διὰ τὸ αὐτό, ἐὰν μὴ μεγέθει ἀπαμύνη-
 ται· οὔτε γὰρ λίπος οὔτε γλυκὺ ἔχει. ἐν γὰρ ζώῳ
 10 τὸ λιπαρὸν γλυκὺ· διὸ αἱ μέλιτται μακροβιώτεραι
 ἐτέρων μειζόνων ζώων.

VI. Ἐν δὲ τοῖς φυτοῖς ἐστὶ τὰ μακροβιώτατα,
 καὶ μᾶλλον ἢ ἐν τοῖς ζώοις, πρῶτον μὲν ὅτι ἥττον
 ὑδατώδη, ὥστ' οὐκ εὐπηκτα· εἰτ' ἔχει λιπαρότητα
 καὶ γλισχρότητα, καὶ ξηρὰ καὶ γεώδη ὄντα ὁμῶς
 10 οὐκ εὐξήραντον ἔχει τὸ ὑγρόν. περὶ δὲ τοῦ πολυ-
 χρόνιον εἶναι τὴν τῶν δένδρων φύσιν δεῖ λαβεῖν τὴν
 αἰτίαν· ἔχει γὰρ ἰδίαν πρὸς τὰ ζῶα, πλὴν πρὸς τὰ
 ἔντομα. νέα γὰρ αἰεὶ τὰ φυτὰ γίνεται· διὸ πολυ-
 χρόνια. αἰεὶ γὰρ ἕτεροι οἱ πτόρθοι, οἱ δὲ γηρά-
 σκουσιν. καὶ αἱ ρίζαι ὁμοίως. ἀλλ' οὐχ ἅμα, ἀλλ'
 15 ὅτε μὲν μόνον τὸ στέλεχος καὶ οἱ κλάδοι ἀπώλονται,
 ἕτεροι δὲ παρεφύησαν· ὅταν δ' οὕτως ᾧσιν, αἱ ρίζαι
 ἄλλαι ἐκ τοῦ ὑπάρχοντος γίνονται, καὶ οὕτως αἰεὶ
 διατελεῖ τὸ μὲν φθειρόμενον τὸ δὲ γινόμενον· διὸ
 καὶ μακρόβια. ἔοικε δὲ τὰ φυτὰ τοῖς ἐντόμοις,
 ὥσπερ εἴρηται πρότερον· διαιρούμενα γὰρ ζῇ, καὶ

ON LENGTH OF LIFE, v.—vi.

if they do occur they are smaller and shorter lived ; for the frost checks their growth.

Both plants and animals die if they do not receive nourishment ; for they consume themselves ; for just as a great flame burns up and destroys the small flame by exhausting what feeds it, so the naturally warm, the prime cause of digestion, exhausts the matter in which it resides. Water animals are less long-lived than land animals, not merely because they are moist, but because they are watery ; this kind of moisture is easily destroyed, because it is cold and easily congealed. For the same reason the bloodless is easily destroyed, unless it is protected by its size ; for it has neither fat nor sweetness. For in the living creature the fat is sweet ; for this reason bees are longer lived than other larger animals.

VI. Among plants there are some very long-lived, even more so than among animals, first because they are less watery, so that the moisture is not readily congealed ; secondly they have oiliness and viscosity, and though dry and earthy, yet have a moisture which is not easily dried. But it is our business to discover the reason of the longevity of the trees ; in relation to living things, except the insects, they have a reason peculiar to themselves. For plants are always being reborn ; that is why they last so long. For some branches are always new, while others grow old. The same is true of their roots. This does not happen at once, but at times the trunk and branches alone are destroyed, and others grow up beside them ; when this is so other roots grow from the existing ones, and so the tree continues, part dying and part being born ; hence their long life. But the plants resemble the insects as has been said above ; for they live even

Longevity
in plants.

467 a

20 δύο καὶ πολλὰ γίνεται ἐξ ἑνός. τὰ δ' ἔντομα μέχρι
 μὲν τοῦ ζῆν ἦλθεν, πολὺν δ' οὐ δύναται χρόνον· οὐ
 γὰρ ἔχει ὄργανα, οὐδὲ δύναται ποιεῖν αὐτὰ ἢ ἀρχὴ
 ἢ ἐν ἐκάστω. ἢ δ' ἐν τῷ φυτῷ δύναται· πανταχῇ
 γὰρ ἔχει καὶ ρίζαν καὶ καυλὸν δυνάμει. διὸ ἀπὸ
 25 ταύτης αἰεὶ προέρχεται τὸ μὲν νέον τὸ δὲ γηράσκον,
 μικρόν τι διαφέροντα τῷ εἶναι μακρόβια, οὕτως
 ὥσπερ τὰ ἀποφυτευόμενα. καὶ γὰρ ἐν τῇ ἀπο-
 φυτεῖα τρόπον τινὰ φαίη ἂν τις ταῦτα συμβαίνειν·
 μόριον γάρ τι τὸ ἀποφυτευθέν. ἐν μὲν οὖν τῇ
 ἀποφυτεῖα χωριζομένων συμβαίνει τοῦτο, ἐκεῖ δὲ
 διὰ τοῦ συνεχοῦς. αἴτιον δ' ὅτι ἐνυπάρχει πάντῃ ἢ
 30 ἀρχὴ δυνάμει ἐνοῦσα.

Συμβαίνει δὲ ταῦτό ἐπὶ τε τῶν ζώων καὶ φυτῶν.
 ἔν τε γὰρ τοῖς ζώοις τὰ ἄρρενα μακροβιώτερα ὥς
 ἐπὶ τὸ πολὺ· τούτων δὲ τὰ ἄνω μείζω ἢ τὰ κάτω
 (νανωδέστερον γὰρ τοῦ θήλεος τὸ ἄρρεν), ἐν δὲ τῷ
 ἄνω τὸ θερμόν, καὶ τὸ ψυχρόν ἐν τῷ κάτω· καὶ τῶν
 467 b φυτῶν τὰ κεφαλοβαρῇ μακροβιώτερα. τοιαῦτα δὲ
 τὰ μὴ ἐπέτεια ἀλλὰ δεινδρώδη· τὸ γὰρ ἄνω τοῦ
 φυτοῦ καὶ κεφαλὴ ἢ ρίζα ἐστὶ, τὰ δ' ἐπέτεια ἐπὶ
 τὸ κάτω καὶ τὸν καρπὸν λαμβάνει τὴν αὔξησιν.
 ἀλλὰ περὶ μὲν τούτου καὶ καθ' αὐτὰ ἐν τοῖς περὶ
 5 φυτῶν διορισθήσεται· νῦν δὲ περὶ τῶν ἄλλων ζώων
 εἴρηται τὸ αἴτιον περὶ τε μεγέθους ζωῆς καὶ βραχυ-
 βιότητος. λοιπὸν δ' ἡμῖν θεωρῆσαι περὶ τε νεότη-
 τος καὶ γήρως καὶ ζωῆς καὶ θανάτου· τούτων γὰρ
 διορισθέντων τέλος ἂν ἢ περὶ τῶν ζώων ἔχοι
 μέθοδος.

^a This treatise is lost.

ON LENGTH OF LIFE, VI.

when divided, and two or more are born from one. But the insects (*i.e.* when divided) continue to live, but they cannot do so for long ; for they have not the necessary organs, nor can the vital principle in each section supply them. But in the plant it can ; for the plant possesses potential root and stalk in every part of it. Consequently there is always proceeding from it part which is young and part which is growing old, differing but little in length of life, just like slips that are taken from it. For one might say that this happens in a sense in the taking of slips ; for the slip is part of the plant. But in the taking of slips the phenomenon occurs when they are separated, but in the other case there is continuity. The reason is that the vital principle exists potentially in every part of the plant.

The same thing occurs both in animals and in plants. For in animals the males are longer lived as a general rule ; in their case the upper parts are larger than the lower (for the male is more dwarflike than the female), but the warmth resides in the upper parts, and the coldness in the lower ; and among plants those with the heaviest heads are the longer lived. Of such a nature are those plants which are not annual, but are like trees ; for the root is really the upper part of the plant and the head, but annuals grow downwards and towards the seed. We shall discuss this matter further, as a separate subject in our treatise on plants^a ; but now as far as animals are concerned we have discussed the reason for their length of life and its short duration. It remains for us to discuss youth and age, life and death ; for when our examination of these subjects is complete, our whole inquiry about living creatures will have reached its end.

ON YOUTH AND OLD AGE
ON LIFE AND DEATH

INTRODUCTION

THESE two titles are conventionally attached to the succeeding treatise, but it is by no means certain that they are right. It is quite possible that Aristotle designed a special essay on Youth and Age, which he never wrote, or alternatively that he wrote such an essay which is lost, and that the present work is on Life and Death only.

Aristotle is here dealing only with natural death, and he finds that life and death depend only upon heat, or more strictly upon the alternate heating and cooling required to preserve the correct temperature. Thus this treatise leads naturally to that On Breathing, which performs, according to Aristotle, a most important function in the preservation of temperature.

The whole of this work is somewhat remote from the standpoint of to-day, and will hardly be of much help to the modern reader.

ΠΕΡΙ ΝΕΟΤΗΤΟΣ ΚΑΙ ΓΗΡΩΣ

ΠΕΡΙ ΖΩΗΣ ΚΑΙ ΘΑΝΑΤΟΥ

487 b

- 10 I. Περὶ δὲ νεότητος καὶ γήρως καὶ περὶ ζωῆς καὶ θανάτου λεκτέον νῦν· ἅμα δὲ καὶ περὶ ἀναπνοῆς ἀναγκαῖον ἴσως τὰς αἰτίας εἰπεῖν· ἐνίοις γὰρ τῶν ζῶν δια τούτο συμβαίνει τὸ ζῆν καὶ τὸ μὴ ζῆν. ἐπεὶ δὲ περὶ ψυχῆς ἐν ἑτέροις διώρισται, καὶ δῆλον ὅτι οὐχ οἷόν τ' εἶναι σῶμα τὴν οὐσίαν αὐτῆς, ἀλλ'
- 15 ὅμως ὅτι γ' ἐν τινι τοῦ σώματος ὑπάρχει μορίῳ, φανερόν, καὶ ἐν τούτῳ τινὶ τῶν ἐχόντων δύναμιν ἐν τοῖς μορίοις. τὰ μὲν οὖν ἄλλα τῆς ψυχῆς ἢ μόρια ἢ δυνάμεις, ὅποτερως ποτὲ δεῖ καλεῖν, ἀφείσθω τὰ νῦν· ὅσα δὲ ζῶα λέγεται καὶ ζῆν, ἐν μὲν τοῖς
- 20 ἀμφοτέρων τούτων τετυχηκόσι (λέγω δ' ἀμφοτέρων τοῦ τε ζῶον εἶναι καὶ τοῦ ζῆν) ἀνάγκη ταυτὸν εἶναι καὶ ἐν μόριον καθ' ὃ τε ζῆ καὶ καθ' ὃ προσ-
αγορεύομεν αὐτὸ ζῶον. τὸ μὲν γὰρ ζῶον ἢ ζῶον, ἀδύνατον μὴ ζῆν· ἢ δὲ ζῆ, ταύτῃ ζῶον ὑπάρχειν οὐκ ἀναγκαῖον· τὰ γὰρ φυτὰ ζῆ μὲν, οὐκ ἔχει δ'
- 25 αἰσθῆσιν, τῷ δ' αἰσθάνεσθαι τὸ ζῶον πρὸς τὸ μὴ ζῶον διορίζομεν.

Ἀριθμῷ μὲν οὖν ἀναγκαῖον ἐν εἶναι καὶ τὸ αὐτὸ τοῦτο τὸ μόριον, τῷ δ' εἶναι πλείω καὶ ἕτερα· οὐ

ON YOUTH AND OLD AGE ON LIFE AND DEATH

I. We must now discuss youth and old age, life and death. At the same time we shall also have to describe the reasons for breathing; for in the case of some animals this constitutes the difference between living and not living. But in another treatise we have laid down definitions about the soul, and it is quite clear that its essence cannot be corporeal, and yet it is equally clear that it resides in some part of a body and that this part is among those which have control. We may now neglect the rest of the parts or functions of the soul, whichever we prefer to call them; what we call animals and living, in the case of those to which both terms are applicable (by both I mean animal and living) must have one and the same part in virtue of which the creature lives, and we call it an animal. For the animal, in so far as it is such, cannot fail to live, but it need not be an animal because it lives: for plants live, but have no sensation, but it is by sensation that we differentiate the animal from that which is not animal.

Speaking numerically this part must be one and the same thing, but in essence more than one and having differences; for the fact of being an animal

The
essential
to life is
sensation.

487 b γὰρ ταῦτὸ τὸ ζῶω τε εἶναι καὶ τὸ ζῆν. ἐπεὶ οὖν
 τῶν ἰδίων αἰσθητηρίων ἐν τι κοινόν ἐστιν αἰσθητή-
 ριον, εἰς ὃ τὰς κατ' ἐνέργειαν αἰσθήσεις ἀναγκαῖον
 30 ἀπαντᾶν, τοῦτο δ' ἂν εἴη μέσον τοῦ πρόσθεν καλου-
 μένου καὶ ὀπισθεν (ἐμπροσθεν μὲν γὰρ λέγεται ἐφ'
 ὃ ἐστὶν ἡμῖν ἡ αἴσθησις, ὀπισθεν δὲ τὸ ἀντι-
 κείμενον), ἔτι δὲ διηρημένου τοῦ σώματος τῶν μὲν
 ζώντων πάντων τῷ τ' ἄνω καὶ κάτω (πάντα γὰρ
 ἔχει τὸ ἄνω καὶ τὸ κάτω, ὥστε καὶ τὰ φυτά),
 488 a δῆλον ὅτι τὴν θρεπτικὴν ἀρχὴν ἔχοι ἂν ἐν μέσῳ
 τούτων· καθ' ὃ μὲν γὰρ εἰσέρχεται μόριον ἢ τροφή,
 ἄνω καλοῦμεν, πρὸς αὐτὸ βλέποντες ἀλλ' οὐ πρὸς
 τὸ περιέχον ὕλον, κάτω δὲ καθ' ὃ τὸ περίττωμα
 ἀφίησι τὸ πρῶτον. ἔχει δ' ἐναντίως τοῖς φυτοῖς
 5 τοῦτο καὶ τοῖς ζώοις· τῷ μὲν γὰρ ἀνθρώπῳ διὰ τὴν
 ὀρθότητα μάλιστα ὑπάρχει τοῦτο τῶν ζώων, τὸ
 ἔχειν τὸ ἄνω μόριον πρὸς τὸ τοῦ παντός ἄνω, τοῖς
 δ' ἄλλοις μεταξύ· τοῖς δὲ φυτοῖς ἀκινήτοις οὖσι καὶ
 λαμβάνουσιν ἐκ τῆς γῆς τὴν τροφήν ἀναγκαῖον ἀεὶ
 10 κάτω τοῦτ' ἔχειν τὸ μόριον. ἀνάλογον γὰρ εἰσιν
 αἱ ρίζαι τοῖς φυτοῖς καὶ τὸ καλούμενον στόμα τοῖς
 ζώοις, δι' οὗ τὴν τροφήν τὰ μὲν ἐκ τῆς γῆς λαμ-
 βάνει, τὰ δὲ δι' αὐτῶν.

II. Τριῶν δὲ μερῶν ὄντων εἰς ἃ διαιρεῖται πάντα
 τὰ τέλεια τῶν ζώων, ἐνὸς μὲν ἥ δέχεται τὴν τροφήν,
 15 ἐνὸς δ' ἥ τὸ περίττωμα προίεται, τρίτου δὲ τοῦ
 μέσου τούτων, τοῦτο ἐν μὲν τοῖς μεγίστοις τῶν
 ζώων καλεῖται στήθος, ἐν δὲ τοῖς ἄλλοις τὸ ἀνά-
 λογον. διήρθρωται δὲ μᾶλλον ἐτέροις ἐτέρων. ὅσα
 δ' αὐτῶν ἐστὶ πορευτικά, πρόσκειται καὶ μόρια τὰ

* Presumably A. means parasitic plants such as mistletoe.

ON YOUTH AND OLD AGE, ETC., I.—II.

is not the same thing as living. Since then there is one common sense organ of all the individual sense organs, in which the senses when actualized must meet, this must lie in between the part called "before" and that called "behind." (By "before" I mean that to which sensation leads, and by "behind" its opposite.) Moreover the bodies of all living creatures being divided into "upper" and "lower" (for they all have upper and lower parts like plants), it is clear that it has the nutritive principle in between the two; the part by which food enters we call the upper part, looking at it by itself, and not considering it in relation to the surrounding universe, but we call the lower part that by which the waste product leaves. This is in a different position in plants and animals; because of his erect position man of all living creatures has this characteristic most conspicuously, that his upper part is also upper in relation to the whole universe, but in other animals it is midway; but plants, as they are immovable and take their food from the soil, always have this part below. For the roots in plants correspond to what is called the mouth in animals; the part, that is, by which some absorb their food from the earth, and others from each other.^a

The nutritive part of the soul.

II. There are three parts into which all the perfect animals are divided, the first part by which they absorb food, the second by which the waste products are evacuated, and the third between the other two. This latter part is called the chest among the largest of living creatures, and by some comparable name among others: but in some it is more specialized than in others. Those animals which have the power of locomotion have in addition parts designed for that

The divisions of the living body.

468 a

πρὸς ταύτην τὴν ὑπηρεσίαν, οἷς τὸ πᾶν οἴσουσι
 20 κύτος, σκέλη τε καὶ πόδες καὶ τὰ τούτοις ἔχοντα
 τὴν αὐτὴν δύναμιν. ἀλλ' ἢ γε τῆς θρεπτικῆς ἀρχῇ
 ψυχῆς ἐν τῷ μέσῳ τῶν τριῶν μορίων καὶ κατὰ τὴν
 αἴσθησιν οὕσα φαίνεται καὶ κατὰ τὸν λόγον· πολλὰ
 γὰρ τῶν ζώων ἀφαιρουμένου ἑκατέρου τῶν μορίων,
 τῆς τε καλουμένης κεφαλῆς καὶ τοῦ δεκτικοῦ τῆς
 25 τροφῆς, ζῆ μεθ' οὗπερ ἂν ἢ τὸ μέσον. δῆλον δ'
 ἐπὶ τῶν ἐντόμων, οἷον σφηκῶν τε καὶ μελιττῶν,
 τοῦτο συμβαῖνον· καὶ τῶν μὴ ἐντόμων δὲ πολλὰ
 διαιρούμενα δύναται ζῆν διὰ τὸ θρεπτικόν. τὸ δὲ
 τοιοῦτον μόριον ἐνεργεία μὲν ἔχει ἔν, δυνάμει δὲ
 πλείω· τὸν αὐτὸν γὰρ συνέστηκε τοῖς φυτοῖς τρό-

80 πον· καὶ γὰρ τὰ φυτὰ διαιρούμενα ζῆ χωρὶς, καὶ
 γίνεται πολλὰ ἀπὸ μιᾶς ἀρχῆς δένδρα. δι' ἣν δ'
 αἰτίαν τὰ μὲν οὐ δύναται διαιρούμενα ζῆν, τὰ δ'

468 b ἀποφυτεύεται τῶν φυτῶν, ἕτερος ἔσται λόγος.

ἀλλ' ὁμοίως ἔχει κατὰ γε τοῦτο τὰ τε φυτὰ καὶ τὸ
 τῶν ἐντόμων γένος. ἀνάγκη δὲ καὶ τὴν θρεπτικὴν
 ψυχὴν ἐνεργεία μὲν ἐν τοῖς ἔχουσιν εἶναι μίαν,
 δυνάμει δὲ πλείους. ὁμοίως δὲ καὶ τὴν αἰσθητικὴν

5 ἀρχήν· φαίνεται γὰρ ἔχοντα αἴσθησιν τὰ διαιρού-
 μενα αὐτῶν. ἀλλὰ πρὸς τὸ σώζεσθαι τὴν φύσιν,
 τὰ μὲν φυτὰ δύναται, ταῦτα δ' οὐ δύναται διὰ τὸ
 μὴ ἔχειν ὄργανα πρὸς σωτηρίαν, ἐνδεᾶ τ' εἶναι τὰ
 μὲν τοῦ ληψομένου τὰ δὲ τοῦ δεξομένου τὴν τροφήν,
 τὰ δ' ἄλλων τε καὶ τούτων ἀμφοτέρων. εἰκόασι

10 γὰρ τὰ τοιαῦτα τῶν ζώων πολλοῖς ζώοις συμ-
 πεφυκόσιν· τὰ δ' ἄριστα συνεστηκότα τοῦτ' οὐ
 πάσχει τῶν ζώων διὰ τὸ εἶναι τὴν φύσιν αὐτῶν ὡς
 ἐνδέχεται μάλιστα μίαν. διὸ καὶ μικρὰν αἴσθησιν
 ἔνια ποιεῖ διαιρούμενα τῶν μορίων, ὅτι ἔχει τι

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service, whereby they can carry the whole trunk ; these are legs and feet, and parts which perform the same functions as these. But the seat of the nutritive faculty of the soul resides in the middle of the three parts, as is evident from sensation, and is in itself reasonable. For many living creatures, when one of the other two parts is lost, that is to say what are called respectively the head and the food receptacle, contrive to live with the part which is in the middle. This clearly happens with such insects as wasps and bees ; and many animals which are not insects can live when divided by means of their nutritive part. A part of this kind is actually one, but potentially more ; for its composition is similar to that of plants ; for plants when divided can live apart, and many trees can arise from one starting-point. The reason why some cannot live when divided, and other plants can be grown from slips, will be the subject of another discussion. But in this regard plants and the class of insects are alike. So also the nutritive soul must be actually one in those who possess it, but potentially more than one. And the same is true of the sensitive first principle ; for the divided parts do seem to have sensation. But in respect of the preservation of their nature, plants can continue to exist, but insects cannot, because they have not the organs necessary to preservation, and are lacking, sometimes in what is to seize and sometimes in what is to receive food, and some others again in both. Animals of this kind are like many creatures joined in one ; but the best constructed animals do not suffer from this because their nature is one in so far as it can be. Some divided parts show but little sensitive power because they have some

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ψυχικὸν πάθος· χωριζομένων γὰρ τῶν σπλάγχχνων
 15 ποιεῖται κίνησιν, οἷον καὶ αἱ χελῶναι τῆς καρδίας
 ἀφηρημένης.

III. Ἐτι δὲ ἐπὶ τε τῶν φυτῶν δῆλον καὶ ἐπὶ τῶν
 ζώων, τῶν μὲν φυτῶν τὴν τ' ἐκ τῶν σπερμάτων
 γένεσιν ἐπισκοποῦσι καὶ τὰς ἐμφυτείας τε καὶ τὰς
 ἀποφυτείας. ἥ τε γὰρ τῶν σπερμάτων γένεσις
 20 συμβαίνει πᾶσιν ἐκ τοῦ μέσου· διθύρων γὰρ ὄντων
 πάντων, ἥ συμπέφυκεν ἔχεται, καὶ τὸ μέσον ἐστὶν
 ἑκατέρου τῶν μορίων· ἐντεῦθεν γὰρ ὃ τε καυλὸς ἐκ-
 φύεται καὶ ἡ ῥίζα τῶν φυομένων, ἡ δ' ἀρχὴ τὸ
 μέσον αὐτῶν ἐστίν. ἔν τε ταῖς ἐμφυτεῖαις καὶ ταῖς
 ἀποφυτεῖαις μάλιστα τοῦτο συμβαίνει περὶ τοὺς
 25 ὄξους· ἔστι γὰρ ἀρχὴ τις ὁ ὄξος τοῦ κλάδου, ἅμα
 δὲ καὶ μέσον, ὥστε ἡ τοῦτο ἀφαιροῦσιν ἢ εἰς τοῦτο
 ἐμβάλλουσιν, ἵνα ἡ ὁ κλάδος ἢ αἱ ῥίζαι ἐκ τούτων
 γίνωνται, ὡς οὐσης τῆς ἀρχῆς ἐκ τοῦ μέσου καυλοῦ
 καὶ ῥίζης.

Καὶ τῶν ζώων τῶν ἐναίμων ἡ καρδιά γίνεται
 πρῶτον. τοῦτο δὲ δῆλον ἐξ ὧν ἐν τοῖς ἐνδεχομένοις
 30 ἔτι γιγνομένοις ἰδεῖν τεθεωρήκαμεν. ὥστε καὶ ἐν
 τοῖς ἀναίμοις ἀναγκαῖον τὸ ἀνάλογον τῇ καρδίᾳ
 γίνεσθαι πρῶτον. ἡ δὲ καρδιά ὅτι ἐστὶν ἀρχὴ τῶν
 φλεβῶν, ἐν τοῖς περὶ τὰ μέρη τῶν ζώων εἶρηται
 489 a πρότερον· καὶ ὅτι τὸ αἷμα τοῖς ἐναίμοις ἐστὶ τελευ-
 ταία τροφή, ἐξ οὗ γίνεται τὰ μόρια. φανερόν
 τοίνυν ὅτι μίαν μὲν τινα ἐργασίαν ἢ τοῦ στόματος
 λειτουργεῖ δυνάμεις, ἑτέραν δ' ἢ τῆς κοιλίας περὶ
 5 τὴν τροφήν. ἡ δὲ καρδιά κυριωτάτη, καὶ τὸ τέλος
 ἐπιτίθησιν. ὥστ' ἀνάγκη καὶ τῆς αἰσθητικῆς καὶ
 τῆς θρεπτικῆς ψυχῆς ἐν τῇ καρδίᾳ τὴν ἀρχὴν εἶναι
 τοῖς ἐναίμοις· τὰ γὰρ τῶν ἄλλων μορίων ἔργα περὶ

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affection of the soul ; for they show movement when their entrails are separated, as tortoises do if their heart is removed.

III. It is moreover quite clear in the case of plants and animals, if we study the origin of plants from seed and grafting and slip-taking. For their growth from seed always begins from the middle : for as all seeds have two cells, growth begins at the point where they join, and the part in between belongs to both the cells ; from this part springs both the stem and the root of the plant, but the source of them is in the middle. In grafting and slip-cutting this occurs most about the eyes ; for the eye is the source of the branch, and is also in the middle, so that they either cut this off, or they graft at this point, in order that the branch or the root may spring from that point, as the origin of both stem and root begins in the middle. Grafting plants.

Of the animals with blood the heart appears first. This is evident from those which we have examined, whose birth can be watched. So also what corresponds to the heart in bloodless animals must be born first. We have stated previously in our treatise *On the Parts of Animals*^a that the heart is the source of the veins ; and that, in animals with blood, the blood is the ultimate source of nourishment, from which the parts are developed. Now it is clear that the mouth performs one function and the stomach another in respect of food. But the heart is the supreme power, and contributes the final step. So that, in animals having blood, the source of the sensitive and nutritive soul must lie in the heart ; for the functions of the other parts in respect of food are for Animals.

^a *De Part. An.* iii. 665 b 15.

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τὴν τροφήν τοῦ ταύτης ἔργου χάριν ἐστί· δεῖ γὰρ τὸ
κύριον πρὸς τὸ οὐ ἕνεκα διατελεῖν, ἀλλ' οὐκ ἐν τοῖς
10 τούτου ἕνεκα, οἷον ἰατρὸς πρὸς τὴν ὑγίειαν. ἀλλὰ
μὴν τό γε κύριον τῶν αἰσθήσεων ἐν ταύτῃ τοῖς
ἐναίμοις πᾶσιν· ἐν τούτῳ γὰρ ἀναγκαῖον εἶναι τὸ
πάντων τῶν αἰσθητηρίων κοινὸν αἰσθητήριον. δύο
δὲ φανερώς ἐνταῦθα συντεινούσας ὁρῶμεν, τὴν τε
γεῦσιν καὶ τὴν ἀφήν, ὥστε καὶ τὰς ἄλλας ἀναγκαῖον·
15 ἐν τούτῳ μὲν γὰρ τοῖς ἄλλοις αἰσθητηρίοις ἐν-
δέχεται ποιεῖσθαι τὴν κίνησιν, ταῦτα δ' οὐδὲν συν-
τείνει πρὸς τὸν ἄνω τόπον. χωρὶς δὲ τούτων, εἰ
τὸ ζῆν ἐν τούτῳ τῷ μορίῳ πᾶσιν ἐστί, δῆλον ὅτι καὶ
τὴν αἰσθητικὴν ἀρχὴν ἀναγκαῖον· ἥ μὲν γὰρ ζῶον,
ταύτῃ καὶ ζῆν φαμέν, ἥ δ' αἰσθητικόν, ταύτῃ τὸ
20 σῶμα ζῶον εἶναι λέγομεν. διὰ τί δ' αἱ μὲν τῶν
αἰσθήσεων φανερώς συντείνουσι πρὸς τὴν καρδίαν,
αἱ δ' εἰσὶν ἐν τῇ κεφαλῇ (διὸ καὶ δοκεῖ τισὶν αἰ-
σθάνεσθαι τὰ ζῶα διὰ τὸν ἐγκεφαλον), τὸ αἷτιον
τούτων ἐν ἑτέροις εἴρηται χωρὶς. κατὰ μὲν οὖν τὰ
φαινόμενα δῆλον ἐκ τῶν εἰρημένων ὅτι ἐν τούτῳ τε
25 καὶ ἐν τῷ μέσῳ τοῦ σώματος τῶν τριῶν μορίων ἥ
τε τῆς αἰσθητικῆς ἀρχῆς ψυχῆς ἐστὶ καὶ ἡ τῆς
αὐξήτικῆς καὶ τῆς θρεπτικῆς.

IV. Κατὰ δὲ τὸν λόγον, ὅτι τὴν φύσιν ὁρῶμεν
ἐν πᾶσιν ἐκ τῶν δυνατῶν ποιούσαν τὸ κάλλιστον.
80 ἐν τῷ μέσῳ δὲ τῆς οὐσίας τῆς ἀρχῆς οὕσης ἑκατέρας
μάλιστα μὲν ἀποτελεῖ τῶν μορίων ἑκάτερον τὸ
αὐτοῦ ἔργον, τό τε κατεργαζόμενον τὴν ἐσχάτην
τροφὴν καὶ τὸ δεκτικόν· πρὸς ἑκατέρῳ γὰρ αὐτῶν
οὕτως ἔσται, καὶ ἔστιν ἡ τοῦ τοιούτου μέση χώρα
489 b ἄρχοντος χώρα. ἔτι τὸ χρώμενον καὶ ᾧ χρῆται,

^a *De Part. An.* 656 b 5.

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the sake of the heart's function ; for the controlling part must lie in what achieves the final aim, not in parts which are subordinate to that aim, like a physician's relation to health. Moreover the controlling power over the senses lies in the heart in all animals having blood ; for in it must lie that sense organ which shares the impressions of all the other sense organs. We can see two that clearly centre in the common sense organ, taste and touch, so that all the others must do so too ; for in this sense organ it is possible for an impulse to be produced in the other sense organs, and these do not reach to the upper part. Apart from this, if life in all creatures lies in this part, it must evidently be the source of sensation ; for we say that anything is alive in so far as it is a living creature, but in so far as it is sensitive we say that it is an animal. Why some of the senses evidently reach out to the heart, and others are in the head (in consequence of which some suppose that animals feel because of their brain), the reason for this has been given separately elsewhere." Judging by appearances it is clear from what we have said that the source of the sensitive, growing and nutritive soul lies here ; that is, in the middle of the three parts of the body.

IV. Judging however by pure reason, it is evident that we see in every case nature produce what is the noblest possible from the available material. As each of the two sources lies in the middle of the whole, each will best perform its own functions, both that which accomplishes the last stage of food, and that which receives it ; this will apply to both cases, and the mid-region of such a faculty will be the region of control. But we must differentiate that which em-

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δεῖ διαφέρειν. ὥσπερ δὲ τὴν δύναμιν, οὕτως ἂν ἐνδέχοιτο καὶ τὸν τρόπον, ὥσπερ οἱ τ' αἰλοὶ καὶ τὸ κινεῖν τοὺς αἰλούς, ἢ χεῖρ. εἴπερ οὖν τὸ ζῶον ὥρισταί τῳ τὴν αἰσθητικὴν ἔχειν ψυχὴν, τοῖς μὲν ἐναίμοις ἀναγκαῖον ἐν τῇ καρδίᾳ ταύτην ἔχειν τὴν ἀρχήν, τοῖς δ' ἀναίμοις ἐν τῳ ἀνάλογον μορίῳ.

Πάντα δὲ τὰ μόρια καὶ πᾶν τὸ σῶμα τῶν ζῶων ἔχει τινὰ σύμφυτον θερμότητα φυσικὴν· διὸ ζῶντα μὲν φαίνεται θερμά, τελευτῶντα δὲ καὶ στερισκό-
 10 μενα τοῦ ζῆν τοῦναντίον. ἀναγκαῖον δὲ ταύτης τὴν ἀρχὴν τῆς θερμότητος ἐν τῇ καρδίᾳ τοῖς ἐναίμοις εἶναι, τοῖς δ' ἀναίμοις ἐν τῳ ἀνάλογον· ἐργάζεται γὰρ καὶ πέττει τῳ φυσικῷ θερμῷ τὴν τροφήν πάντα, μάλιστα δὲ τὸ κυριώτατον. διὸ τῶν μὲν ἄλλων μορίων ψυχομένων ὑπομένει τὸ ζῆν, τοῦ δ' ἐν ταύτῃ φθείρεται πάμπαν, διὰ τὸ
 15 τὴν ἀρχὴν ἐντεῦθεν τῆς θερμότητος ἡρτῆσθαι πᾶσι, καὶ τῆς ψυχῆς ὥσπερ ἐμπεπυρευμένης ἐν τοῖς μορίοις τούτοις, τῶν μὲν ἀναίμων ἐν τῳ ἀνάλογον, ἐν δὲ τῇ καρδίᾳ τῶν ἐναίμων. ἀνάγκη τοίνυν ἅμα τό τε ζῆν ὑπάρχειν καὶ τὴν τοῦ θερμοῦ τούτου σωτηρίαν, καὶ τὸν καλούμενον θάνατον εἶναι
 20 τὴν τούτου φθοράν.

V. Ἀλλὰ μὴν πυρὸς γε δύο ὁρῶμεν φθοράς, μάρανσιν τε καὶ σβέσιν. καλοῦμεν δὲ τὴν μὲν ὑφ' αὐτοῦ μάρανσιν, τὴν δ' ὑπὸ τῶν ἐναντίων σβέσιν, τὴν μὲν γήρα, τὴν δὲ βίαιον. συμβαίνει δ' ἀμφοτέρας διὰ ταῦτ' ὅτι γίνεσθαι τὰς φθοράς· ὑπο-
 25 λειπούσης γὰρ τῆς τροφῆς, οὐ δυναμένου λαμβάνειν τοῦ θερμοῦ τὴν τροφήν, φθορὰ γίνεται τοῦ

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ploy from that which it employs. It should be possible to do this in terms of its function, just as we distinguish flutes and what causes the movement in flutes, that is the hand. Since then the animal is defined by the possession of a sensitive soul, in animals with blood this source must be in the heart, and in bloodless animals in some part corresponding to it.

Now all parts and indeed the whole body of living creatures contain within them some natural heat : Function of the heart. so when alive they are felt to be warm, but when dead and deprived of life the opposite of this. Now the source of this warmth must lie in the heart in animals with blood, and in the bloodless in some corresponding part ; for everything carries on its function and digests food by means of its natural heat, and this is most true of the part with most control. So when other parts get chilled life remains, but when the region of the heart gets cold, the whole body is destroyed, because the principle of all parts depends entirely on the heat therein, and the soul in these parts is so to speak fired, in animals with blood in the heart, and in the bloodless in what corresponds to the heart. Thus life must depend on the conservation of this heat, and what we know as death is the destruction of this heat.

V. Now we know two ways in which fire is de- Destruction of heat.stroyed—by dying out and by extinguishing. By dying out we mean a decay arising from itself, and by an extinguishing a decay caused by opposites : one is death by old age and the other by violence. But both these forms of destruction arise from the same cause ; for in both cases fire dies from the failure of what feeds it, that is when it cannot get

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πυρός. τὸ μὲν γὰρ ἐναντίον παῦον τὴν πέψιν
 κωλύει τρέφεσθαι· ὅτε δὲ μαραίνεσθαι συμβαίνει,
 πλείονος ἀθροιζομένου θερμοῦ διὰ τὸ μὴ ἀναπνεῖν
 30 μῆδὲ καταψύχεσθαι· ταχὺ γὰρ καὶ οὕτω κατανα-
 λίσκει τὴν τροφήν πολὺ συναθροιζόμενον τὸ θερμόν,
 καὶ φθάνει καταναλίσκον πρὶν ἐπιστῆναι τὴν ἀνα-
 θυμίασιν. διόπερ οὐ μόνον μαραίνεται τὸ ἐλαττον
 παρὰ τὸ πλείον πῦρ, ἀλλὰ καὶ αὕτη καθ' αὐτὴν ἡ
 470 α τοῦ λύχνου φλόξ ἐντιθεμένη πλείονι φλογὶ κατα-
 κάεσθαι, καθάπερ ὁτιοῦν ἄλλο τῶν καυστῶν. αἷτιον
 δ' ὅτι τὴν μὲν οὖσαν ἐν τῇ φλογὶ τροφήν φθάνει
 λαμβάνουσα ἢ μείζων φλόξ πρὶν ἐπελθεῖν ἑτέραν,
 τὸ δὲ πῦρ αἰεὶ διατελεῖ γινόμενον καὶ ῥέον ὥσπερ
 5 ποταμός, ἀλλὰ λανθάνει διὰ τὸ τάχος.

Δῆλον τοίνυν ὡς εἴπερ δεῖ σώζεσθαι τὸ θερμόν
 (τοῦτο δ' ἀναγκαῖον, εἴπερ μέλλει ζῆν), δεῖ γίνεσθαι
 τινα τοῦ θερμοῦ τοῦ ἐν τῇ ἀρχῇ κατάψυξιν. παρά-
 δειγμα δὲ τούτου λαβεῖν ἔστι τὸ συμβαῖνον ἐπὶ
 τῶν καταπνιγομένων ἀνθράκων· ἂν μὲν γὰρ ὦσι-
 10 περιπεπωμασμένοι τῷ καλουμένῳ πνιγεί συνεχῶς,
 ἀποσβέννυνται ταχέως· ἂν δὲ παρ' ἄλληλά τις
 ποιῇ πυκνὰ τὴν ἀφαίρεσιν καὶ τὴν ἐπίθεσιν, μένουσι
 πεπυρωμένοι πολὺν χρόνον. ἢ δ' ἔγκρυψις σώζει
 τὸ πῦρ· οὕτε γὰρ ἀποπνεῖν κωλύεται διὰ μονότητα
 τῆς τέφρας, ἀντιφράττει τε τῷ περίξ ἀέρι πρὸς τὸ
 15 μὴ σβεννύναι τῷ πλήθει τῆς ἐνυπαρχούσης αὐτῷ
 θερμότητος. ἀλλὰ περὶ μὲν τῆς αἰτίας ταύτης,
 ὅτι τὸ ἐναντίον συμβαίνει τῷ ἐγκρυπτομένῳ καὶ
 καταπνιγομένῳ πυρί (τὸ μὲν γὰρ μαραίνεται, τὸ
 δὲ διαμένει πλείω χρόνον), εἴρηται ἐν τοῖς προ-
 βλήμασιν.

food for the heat. The opposite (extinguishing) prevents the fire from being fed by checking its assimilation ; but when it dies out, it is because too much heat is collected and is due to the fact that there is neither breathing nor cooling ; for in this case the great heat collected quickly uses up the food, and finishes expending it before the vapour rises. Consequently not only does the smaller fire fade out in the presence of a greater one, but the flame of the lamp, when placed in a larger one, is burned up entirely by itself, just like any other combustible. The reason is that the greater flame seizes the food available in the flame before the other can get to it, and the fire continues to grow and flow like a river, but its speed is so great that it is not noticed.

It is obvious therefore that if the heat is to be preserved (and it must be if the creature is to continue to live) there must be some cooling down of the initial heat. We can find an illustration of this in what occurs when coals are damped down. For if they are covered continuously with a lid, which we call a choke, they are very soon quenched ; but if one alternately puts on and takes off the lid many times, they remain alight for a long time. For the masking of a fire preserves it ; for the air is not prevented from getting to it owing to the porous nature of the ashes, and it protects it from the surrounding air, so that it is not extinguished by the quantity of heat enclosed in it. But we have discussed in the *Problems*^a the reason why the contrary effect occurs in a masked and in a choked fire (that is the latter is quenched, while the former lasts a long time).

^a The passage in question is not extant.

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VI. Ἐπεὶ δὲ πᾶν ζῶον ἔχει ψυχὴν, αὐτὸ δ' οὐκ
 20 ἄνευ φυσικῆς ὑπάρχει θερμότητος, ὥσπερ εἵπομεν,
 τοῖς μὲν φυτοῖς ἢ διὰ τῆς τροφῆς καὶ τοῦ περι-
 έχοντος ἱκανὴ γίνεται βοήθεια πρὸς τὴν τοῦ φυσικοῦ
 θερμοῦ σωτηρίαν. καὶ γὰρ ἡ τροφή ποιεῖ κατά-
 ψυξιν εἰσιούσα, καθάπερ καὶ τοῖς ἀνθρώποις τὸ
 πρῶτον προσενεγκαμένοις· αἱ δὲ νηστεῖαι θερ-
 25 μαίνουνσι καὶ δίψας ποιοῦσιν· ἀκίνητος γὰρ ὢν ὁ
 ἀῆρ ἀεὶ θερμαίνεται, τῆς δὲ τροφῆς εἰσιούσης
 καταψύχει κινούμενος, ἕως ἂν λάβῃ τὴν πέψιν.
 εἰ δὲ ἡ τὸ περιέχον ὑπερβάλλῃ ψυχρότητι διὰ
 τὴν ὥραν, ἰσχυρῶν γινομένων πάγων, ἐξαναίνεται,
 ἡ τοῦ θέρους ἰσχυρὰ συμβαίνει καύματα καὶ μὴ
 30 δύνηται τὸ σπώμενον ἐκ τῆς γῆς ὑγρὸν κατα-
 ψύχειν, φθείρεται μαραινόμενον τὸ θερμόν, καὶ
 λέγεται σφακελίζειν καὶ ἀστροβλήτα γίνεσθαι τὰ
 δένδρα περὶ τοὺς καιροὺς τούτους. διὸ καὶ γένη-
 τινὰ λίθων ταῖς ῥίζαις ὑποβάλλουσι καὶ ὕδωρ ἐν
 470 b ἀγγείοις, ὅπως αἱ ῥίζαι ψύχωνται τῶν φυτῶν.
 τῶν δὲ ζώων ἐπεὶ τὰ μὲν ἐστὶν ἔνυδρα τὰ δ' ἐν
 τῷ ἀέρι ποιεῖται τὴν δίαιταν, ἐκ τούτων καὶ διὰ
 τούτων πορίζεται τὴν κατάψυξιν, τὰ μὲν τῷ ὕδατι
 5 τὰ δὲ τῷ ἀέρι. τίνα δὲ τρόπον καὶ πῶς, λεκτέον.
 ἐπιστήσασι τὸν λόγον μᾶλλον.

ON YOUTH AND OLD AGE, ETC., VI.

VI. But since every living creature has a soul, and Heat and cooling in living creatures. no living creature exists without containing natural heat, as we have said, the assistance which plants get through food and their environment is sufficient for the preservation of their natural heat. For the entry of food causes a cooling, just as it does in man when he first admits it; but fasting causes heat and thirst; for the air when it is motionless always grows hot, but, moving as it does when food enters it, it becomes cool, until it is digested. If the environment is excessively cold owing to the season of the year, when hard frosts occur, the plant withers; if on the other hand the summer heat comes and, as the moisture is drawn out of the ground, there can be no cooling, it dies because the heat wastes away, and plants at such seasons are said to be blighted and sun-struck. For this reason men put some kinds of stones under the roots and water in flower pots, that the roots of the plants may be cooled. But in the case of animals, since some live in water and others spend their lives in air, they achieve the cooling from and by these elements—some that is by water and some by air. In what manner and how this occurs can only be described after a closer study of the subject.

ON RESPIRATION

INTRODUCTION

IN this account of breathing Aristotle is far more the physiologist than the philosopher, and for this very reason his conclusions are of comparatively small value to us. The science of biochemistry was not born in the days of Aristotle, and without it any account of the physiology of breathing must of necessity be almost valueless to-day.

ΠΕΡΙ ΑΝΑΠΝΟΗΣ

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Ι. Περὶ γὰρ ἀναπνοῆς ὀλίγοι μὲν τινες τῶν πρότερον φυσικῶν εἰρήκασιν· τίνος μέντοι χάριν ὑπάρχει τοῖς ζώοις, οἱ μὲν οὐδὲν ἀπεφήναντο, οἱ δὲ εἰρήκασιν μὲν, οὐ καλῶς δ' εἰρήκασιν ἀλλ' ἀπειρο-
10 τέρως τῶν συμβαινόντων. ἔτι δὲ πάντα τὰ ζῶα φασιν ἀναπνεῖν· τοῦτο δ' οὐκ ἔστιν ἀληθές. ὥστ' ἀναγκαῖον περὶ τούτων πρῶτον ἐπελθεῖν, ὅπως μὴ δοκῶμεν ἀπόντων κενὴν κατηγορεῖν.

Ὅτι μὲν οὖν ὅσα πλεύμονα ἔχει τῶν ζώων, ἀναπνεῖ πάντα, φανερόν. ἀλλὰ καὶ τούτων αὐτῶν ὅσα μὲν ἄναιμον ἔχει τὸν πλεύμονα καὶ σομφόν,
15 ἥττον δέονται τῆς ἀναπνοῆς· διὸ πολὺν χρόνον ἐν τοῖς ὕδασι δύνανται διαμένειν παρὰ τὴν τοῦ σώματος ἰσχύν. τὸν δὲ πλεύμονα σομφὸν ἔχει πάντα τὰ ψοτοκοῦντα, οἷον τὸ τῶν βατράχων γένος. ἔτι δὲ αἱ ἐμύδες τε καὶ χελῶναι πολὺν χρόνον μένουσιν
20 ἐν τοῖς ὕδροις· ὁ γὰρ πλεύμων ὀλίγην ἔχει θερμότητα· ὀλίγαιμον γὰρ ἔχουσιν αὐτόν· ἐμφυσώμενος οὖν αὐτὸς τῇ κινήσει καταψύχει καὶ ποιεῖ διαμένειν πολὺν χρόνον. ἐὰν μέντοι βιάζηται τις λίαν κατέχων πολὺν χρόνον, ἀποπνίγονται πάντα· οὐδὲν γὰρ τῶν τοιούτων δέχεται τὸ ὕδωρ ὥσπερ οἱ ἰχθύς. τὰ δ' ἔναιμον ἔχοντα τὸν πλεύμονα

ON RESPIRATION

I. A few natural philosophers have dealt with the question of breathing ; some of them have offered no explanation why this phenomenon occurs in living creatures ; others have discussed it without much insight, and with insufficient experiment on the facts. Again they say that all living creatures breathe ; but this is not true. We must then first approach this question, so that we may not be thought to be passing a baseless censure on men who are not there to defend themselves.

Animals
and
breathing.

It is of course quite obvious that all living creatures with lungs breathe. Furthermore animals which have a bloodless or spongy lung, need breathing less than the others ; this is why they can remain in water a long time for their bodily strength. All oviparous animals have a porous lung, such as the genus frog. Again both the fresh-water and sea tortoise live in water for a long time ; for the lung contains but little heat, for it contains but little blood ; being inflated by its movement cooling is rapid, and the animal is thus able to remain under water for a long time. But if one forces it by holding it down too long, an animal of this kind is drowned ; for none of these animals can absorb water like the fish. All animals which have a lung containing blood

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²⁵ πάντα μᾶλλον δέεται τῆς ἀναπνοῆς διὰ τὸ πλῆθος τῆς θερμότητος· τῶν δ' ἄλλων ὅσα μὴ ἔχει πλεῦμονα, οὐδὲν ἀναπνεῖ.

- II. Δημόκριτος μὲν οὖν ὁ Ἀβδηρίτης καὶ τινες ἄλλοι τῶν περὶ ἀναπνοῆς εἰρηκότων οὐδὲν περὶ
³⁰ τῶν ἄλλων διωρίκασιν ζώων, εἰκόκασιν μέντοι λέγειν ὡς πάντων ἀναπνεόντων· Ἀναξαγόρας δὲ καὶ Διογένης, πάντα φάσκοντες ἀναπνεῖν, περὶ τῶν ἰχθύων καὶ τῶν ὀστρεῶν λέγουσι τίνα τρόπον ἀναπνεύουσιν. καὶ φησιν Ἀναξαγόρας μὲν, ὅταν
^{471 a} ἀφῶσι τὸ ὕδωρ διὰ τῶν βραγχίων, τὸν ἐν τῷ στόματι γίνομενον ἀέρα ἔλκοντας ἀναπνεῖν τοὺς ἰχθύς· οὐ γὰρ εἶναι κενὸν οὐδέν· Διογένης δ' ὅταν ἀφῶσι τὸ ὕδωρ διὰ τῶν βραγχίων, ἐκ τοῦ περὶ τὸ στόμα περιεστῶτος ὕδατος ἔλκειν τῷ κενῷ τῷ
⁵ ἐν τῷ στόματι τὸν ἀέρα, ὡς ἐνόντος ἐν τῷ ὕδατι ἀέρος. ταῦτα δ' ἐστὶν ἀδύνατα. πρῶτον μὲν γὰρ τὸ ἥμισυ τοῦ πράγματος ἀφαιροῦσι, διὰ τὸ τὸ κοινὸν ἐπὶ θατέρου λέγεσθαι μόνον. ἀναπνοὴ γὰρ καλεῖται, ταύτης δὲ τὸ μὲν ἐκπνοή ἐστι τὸ δ' εἰσπνοή· περὶ ἧς οὐθὲν λέγουσι, τίνα τρόπον
¹⁰ ἐκπνέουσι τὰ τοιαῦτα τῶν ζώων. οὐδ' ἐνδέχεται αὐτοῖς εἰπεῖν· ὅταν γὰρ ἀναπνεύσωσι, ταύτῃ ἢ ἀνέπνευσαν πάλιν δεῖ ἐκπνεῖν, καὶ τοῦτο ποιεῖν αἰεὶ παραλλάξ, ὥστε συμβαίνει ἅμα δέχεσθαι τὸ ὕδωρ κατὰ τὸ στόμα καὶ ἐκπνεῖν. ἀνάγκη δ' ἀπαντῶντα ἐμποδίζειν θάτερον θατέρω. εἰτα ὅταν
¹⁵ ἀφῶσι τὸ ὕδωρ, τότε ἐκπνέουσι κατὰ τὸ στόμα ἢ κατὰ τὰ βράγχια, ὥστε συμβαίνει ἅμα ἐκπνεῖν καὶ ἀναπνεῖν· τότε γάρ φασιν αὐτὸ ἀναπνεῖν. ἅμα δ' ἀναπνεῖν καὶ ἐκπνεῖν ἀδύνατον. ὥστ' εἰ ἀνάγκη

ON RESPIRATION, I.—II.

require more breathing because of their quantity of heat ; but the other creatures which have no lung do not breathe at all.

II. Democritus of Abdêra and certain others who have discussed breathing have not differentiated between living animals, but appear to speak as if they all breathed ; Anaxagoras and Diogenes, asserting that all creatures breathe, describe the method by which fishes and oysters breathe. Anaxagoras says that fishes breathe by drawing up the air in the mouth, when they discharge water through their gills ; for a vacuum cannot exist ; Diogenes says that by means of the vacuum in the mouth they breathe by drawing the air from the water surrounding the mouth, whenever they let out water through the gills, because there is air in the water. But this is impossible. First of all they leave out half the facts, by assigning to one side only what is common to both. For what is called breathing includes both breathing out and breathing in. But of the former they make no mention ; how, that is, such animals breathe out. Nor can they explain it ; for when animals breathe in, they must breathe out again in the same way as they breathe in, and must perform these functions alternately, so that they would have to receive water into the mouth and breathe out at the same time. The one operation must clearly meet and obstruct the other. Again, when they discharge the water, they are at the same time breathing out by the mouth or by the gills, so that they must exhale and inhale at the same time ; for they say that this is the time at which they inhale. But it is impossible to inhale and exhale at the same time. The conclusion would then follow that, if

Breathing
in fishes.

471 a

τὰ ἀναπνέοντα ἐκπνεῖν καὶ εἰσπνεῖν, ἐκπνεῖν δὲ μὴ ἐνδέχεται μηδὲν αὐτῶν, φανερόν ὥς οὐδ' ἀναπνεῖ αὐτῶν οὐδέν.

20 III. Ἔτι δὲ τὸ φάναι τὸν αἶρα ἔλκειν ἐκ τοῦ στόματος ἢ ἐκ τοῦ ὕδατος διὰ τοῦ στόματος ἀδύνατον· οὐ γὰρ ἔχουσιν ἀρτηρίαν διὰ τὸ πλεύμονα μὴ ἔχειν, ἀλλ' εὐθύς ἢ κοιλία πρὸς τῷ στόματί ἐστιν, ὥστ' ἀναγκαῖον τῇ κοιλίᾳ ἔλκειν. τοῦτο δὲ καὶ τὰλλα ἐποίει ζῶα· νῦν δὲ οὐ ποιοῦσιν.

25 καὶ ἐκεῖνα δ' ἔξω τοῦ ὕγρου ὄντα ἐπιδήλως ἂν αὐτὸ ἐποίει· φαίνεται δ' οὐ ποιοῦντ' αὐτό. ἔτι πάντων τῶν ἀναπνεόντων καὶ ἑλκόντων τὸ πνεῦμα ὁρῶμεν γινομένην κίνησιν τινα τοῦ μορίου τοῦ ἑλκοντος, ἐπὶ δὲ τῶν ἰχθύων οὐ συμβαῖνον· οὐδὲν γὰρ φαίνονται κινεῦντες τῶν περὶ τὴν κοιλίαν, 30 ἀλλ' ἢ τὰ βράγχια μόνον, καὶ ἐν τῷ ὕγρῳ καὶ εἰς τὸ ξηρὸν ἐκπесόντες, ὅταν σπαίρωσιν. ἔτι ὅταν

471 b ἀποθνήσκῃ πινιγόμενα ἐν τοῖς ὕγροις πάντα τὰ ἀναπνέοντα, γίνονται πομφόλυγες τοῦ πνεύματος ἐξιόντος βιαίως, οἷον ἐάν τις βιάζηται χελώνας ἢ βατράχους ἢ τι ἄλλο τῶν τοιούτων γενῶν· ἐπὶ δὲ τῶν ἰχθύων οὐ συμβαίνει πειρωμένοις πάντα

5 τρόπον, ὥς οὐκ ἐχόντων πνεῦμα θύραθεν οὐθέν. ὃν τε τρόπον λέγουσι γίνεσθαι τὴν ἀναπνοὴν αὐτοῖς, ἐνδέχεται καὶ τοῖς ἀνθρώποις οὔσιν ἐν τῷ ὕγρῳ συμβαίνειν· εἰ γὰρ καὶ οἱ ἰχθύες ἔλκουσιν ἐκ τοῦ πέριξ ὕδατος τῷ στόματι, διὰ τί τοῦτο οὐκ ἂν ποιοῖμεν καὶ οἱ ἄνθρωποι καὶ τὰλλα ζῶα; καὶ

10 τὸν ἐκ τοῦ στόματος δ' ἂν ἔλκοιμεν ὁμοίως τοῖς ἰχθύσιν. ὥστ' εἴπερ κακεῖνα ἦν δυνατά, καὶ ταῦτ' ἂν ἦν· ἐπεὶ δ' οὐκ ἔστι, δηλὸν ὥς οὐδ' ἐπ' ἐκείνων ἐστίν. πρὸς δὲ τούτοις διὰ τίν' αἰτίαν ἐν τῷ ἀέρι

ON RESPIRATION, II.—III.

breathing creatures must both exhale and inhale, and they cannot exhale at all, none of them can breathe at all.

III. Again to say that they draw in air from the mouth, or from the water by way of the mouth is impossible ; for they have no windpipe because they have no lung, but the stomach is close up to the mouth, so that it would have to draw in the air by the stomach. In that case other living creatures would do the same thing ; but as a matter of fact they do not. Those also which live out of water would evidently do it too ; but it is clear that they do not. Again, in the case of all creatures which breathe and draw breath, we see that there is some movement of the part which draws, but this does not happen with fishes ; for no movement can be seen of the parts about the stomach, but only the gills move, both in water, and when they are thrown out on to land, so long as they breathe. Again when all breathing animals die of drowning in water, bubbles of air violently expelled rise ; for instance if one holds down by force tortoises, or frogs, or any other such species ; but it does not happen in the case of fishes, however much we try, as they do not draw any breath from outside. But the method by which they explain animals' breathing might also apply to men in water ; for if fish draw air from the surrounding water by the mouth, why should not we men and all other living creatures do the same thing ? Then we should draw the air from the mouth just like the fishes. If the one were possible, so also would the other be ; but since it is not true in the one case, it is clear that it is not true in the other either. In addition to this why do fishes die in the air, and are

The
physiology
of the fish.

471 b

ἀποθνήσκουσι καὶ φαίνονται ἀσπαρίζοντα ὥσπερ
 τὰ πνιγόμενα, εἵπερ ἀναπνέουσιν; οὐ γὰρ δὴ
 15 τροφῆς γε ἐνδεία τοῦτο πάσχουσιν. ἦν γὰρ λέγει
 Διογένης αἰτίαν, εὐήθης· φησὶ γὰρ ὅτι τὸν ἀέρα
 πολὺν ἔλκουσι λίαν ἐν τῷ ἀέρι, ἐν δὲ τῷ ὕδατι
 μέτριον, καὶ διὰ τοῦτ' ἀποθνήσκειν. καὶ γὰρ ἐπὶ
 τῶν πεζῶν ἔδει δυνατόν εἶναι τοῦτο συμβαίνειν·
 νῦν δ' οὐδὲν τῷ σφόδρα ἀναπνεῦσαι ἀποπνίγεται
 20 πεζὸν ζῶον. ἔτι δ' εἰ πάντα ἀναπνεῖ, δῆλον ὅτι
 καὶ τὰ ἔντομα τῶν ζώων ἀναπνεῖ· φαίνεται δ'
 αὐτῶν πολλὰ διατεμνόμενα ζῆν, οὐ μόνον εἰς δύο
 μέρη ἀλλὰ καὶ εἰς πλείω, οἷον αἱ καλούμεναι σκολό-
 πενδραι· ἃ πῶς ἢ τίνι ἐνδέχεται ἀναπνεῖν; αἴτιον
 δὲ μάλιστα τοῦ μὴ λέγεσθαι περὶ αὐτῶν καλῶς
 25 τό τε τῶν μορίων ἀπείρους εἶναι τῶν ἐντός, καὶ
 μὴ λαμβάνειν ἕνεκά τινος τὴν φύσιν πάντα ποιεῖν·
 ζητοῦντες γὰρ τίνος ἕνεκα ἡ ἀναπνοὴ τοῖς ζώοις
 ὑπάρχει, καὶ ἐπὶ τῶν μορίων τοῦτ' ἐπισκοποῦντες,
 οἷον ἐπὶ βραγχίων καὶ πλεύμονος, εὖρον ἂν θᾶπτον
 τὴν αἰτίαν.

30 IV. Δημόκριτος δ' ὅτι μὲν ἐκ τῆς ἀναπνοῆς
 συμβαίνει τι τοῖς ἀναπνέουσι λέγει, φάσκων κωλύειν
 472 a ἐκθλίβεσθαι τὴν ψυχὴν· οὐ μέντοι ὥς τούτου γ'
 ἕνεκα ποιήσασαν τοῦτο τὴν φύσιν οὐθὲν εἴρηκεν·
 ὅλως γὰρ ὥσπερ καὶ οἱ ἄλλοι φυσικοί, καὶ οὗτος
 οὐθὲν ἄπτεται τῆς τοιαύτης αἰτίας. λέγει δ' ὥς
 ἡ ψυχὴ καὶ τὸ θερμὸν ταῦτόν τὰ πρῶτα σχήματα
 5 τῶν σφαιροειδῶν. συγκρινομένων οὖν αὐτῶν ὑπὸ
 τοῦ περιέχοντος ἐκθλίβοντος, βοήθειαν γίνεσθαι
 τὴν ἀναπνοὴν φησιν. ἐν γὰρ τῷ ἀέρι πολὺν

ON RESPIRATION, III.—IV.

seen to gasp convulsively as if they were choking, if they can breathe? For their symptoms are not due to lack of food. The explanation which Diogenes gives is childish; he says that in the air they absorb too much of the air, but in the water only a moderate quantity, and that this is why they die. But in that case it ought to be possible for it to happen with land creatures, but in point of fact no land animal has ever been choked by breathing in too much. Again if every living creature breathes in air, it is obvious that insects as well as other animals should breathe; but many of them seem to continue living even when severed, not merely into two parts but into more, for instance the so-called centipedes; how and with what organ can they breathe? The reason why men have given a false account of them is that they have never examined their internal anatomy, and have not considered the end in view that nature has in all creation; for if they had inquired why breathing is characteristic of animals, and had considered the question in the light of their parts, for instance the gills and lungs, they would have discovered the reason more easily.

IV. Democritus states that among animals that breathe there is a result of their breathing, and alleges that it prevents the soul from being crushed out; but he nowhere says that this is why nature has invented breathing; for generally speaking, like other natural philosophers, he never reckons upon any reason of this kind. But he does identify the soul with the heat, regarding both as first forms of spherical particles. So he contends that when these particles are being crushed by the surrounding air, which is pressing them out, breathing intervenes to help them.

Why do
any living
creatures
breathe?

Refutation
of Demo-
critus.

472 a

ἀριθμὸν εἶναι τῶν τοιούτων ἃ καλεῖ ἐκείνος νοῦν
καὶ ψυχὴν· ἀναπνέοντος οὖν καὶ εἰσιόντος τοῦ
ἀέρος συνεισιόντα ταῦτα, καὶ ἀνείργοντα τὴν
10 θλίψιν, κωλύειν τὴν ἐνοῦσαν ἐν τοῖς ζώοις διέναι
ψυχὴν. καὶ διὰ τοῦτο ἐν τῷ ἀναπνεῖν καὶ ἐκπνεῖν
εἶναι τὸ ζῆν καὶ τὸ ἀποθνήσκειν· ὅταν γὰρ κρατῇ
τὸ περιέχον συνθλίβον, καὶ μηκέτι θύραθεν εἰσιδὼν
δύνηται ἀνείργειν, μὴ δυναμένου ἀναπνεῖν, τότε
συμβαίνειν τὸν θάνατον τοῖς ζώοις· εἶναι γὰρ τὸν
15 θάνατον τὴν τῶν τοιούτων σχημάτων ἐκ τοῦ
σώματος ἔξοδον ἐκ τῆς τοῦ περιέχοντος ἐκθλίψεως.
τὴν δ' αἰτίαν διὰ τί ποτε πᾶσι μὲν ἀναγκαῖον
ἀποθανεῖν, οὐ μέντοι ὅτε ἔτυχεν ἀλλὰ κατὰ φύσιν
μὲν γῆρα, βία δὲ παρὰ φύσιν, οὐθὲν δεδήλωκεν.
καίτοι ἐχρῆν, ἐπεὶ ὅτε μὲν φαίνεται τοῦτο γινώ-
20 μενον, ὅτε δ' οὐ φαίνεται, πότερον τὸ αἷτιον ἔξωθεν
ἐστίν ἢ ἐντός. οὐ λέγει δὲ οὐδὲ περὶ τῆς ἀρχῆς
τοῦ ἀναπνεῖν τί τὸ αἷτιον, πότερον ἔσωθεν ἢ
ἔξωθεν· οὐ γὰρ δὴ ὁ θύραθεν νοῦς τηρεῖ τὴν βοή-
θειαν, ἀλλ' ἔσωθεν ἢ ἀρχὴ τῆς ἀναπνοῆς γίνεται
καὶ τῆς κινήσεως, οὐχ ὡς βιαζομένου τοῦ περι-
25 ἔχοντος. ἄτοπον δὲ καὶ τὸ ἅμα τὸ περιέχον συν-
θλίβειν καὶ εἰσιδὼν διαστέλλειν. ἃ μὲν οὖν εἴρηκε
καὶ ὥς, σχεδὸν ταῦτ' ἐστίν.

Εἰ δὲ δεῖ νομίζειν ἀληθῆ εἶναι τὰ πρότερον λεχ-
θέντα καὶ μὴ πάντα τὰ ζῶα ἀναπνεῖν, οὐ περὶ
παντὸς θανάτου τὴν αἰτίαν ὑποληπτέον εἰρηῇσθαι
ταύτην, ἀλλὰ μόνον ἐπὶ τῶν ἀναπνεόντων. οὐ
30 μὴν οὐδ' ἐπὶ τούτων καλῶς. δῆλον δ' ἐκ τῶν

ON RESPIRATION, iv.

For in the air are a large number of these particles, which he calls mind and soul ; so that when breathing takes place and the air enters, these enter too and check the crushing, preventing the soul which is in the animal from passing out. For this reason upon breathing in and breathing out depend life and death ; for when the surrounding air by its crushing action wins the mastery, and nothing entering from the outside can check it, as breathing is impossible, death then comes to living creatures ; for he considers that death is the passing out of such forms from the body owing to the pressure of the surrounding air. But the reason why all living creatures must die at some time, though not at any particular time, but either naturally by old age or unnaturally by violence, he has nowhere explained. And yet he should have explained it, since sometimes it can be seen happening and sometimes not, whether the cause is external or internal. He does not even say of the origin of breathing, what its cause is, nor whether it begins from the outside or the inside. As a matter of fact the mind does not watch from the outside for the time to help, but the origin of breathing and of all movement comes from inside, and not by pressure from the surrounding air. It is improbable that the surrounding air causes compression and by entering causes expansion at the same time. For what he has said, and his way of explaining it, almost amounts to this.

But if we are to believe what has been said before—that not all living creatures breathe—one must suppose that this cannot be alleged as the cause of death in every case, but only in the case of breathing animals. It is not quite a satisfactory explanation even in their case. This is clear from the facts and

- 472 a συμβαινόντων καὶ τῶν τοιούτων ὧν ἔχομεν πάντες
 πείραν. ἐν γὰρ ταῖς ἀλέαις θερμαινόμενοι μᾶλλον
 καὶ τῆς ἀναπνοῆς μᾶλλον δεόμεθα καὶ πυκνότερον
 ἀναπνέομεν πάντες· ὅταν δὲ τὸ περίξ ἢ ψυχρὸν
 καὶ συνάγῃ καὶ συμπηγνύῃ τὸ σῶμα, κατέχειν
 35 συμβαίνει τὸ πνεῦμα. καίτοι τότε ἔχρῃν τὸν
 472 b θύραθεν εἰσιόντα κωλύειν τὴν σύνθλιψιν. νῦν
 δὲ γίνεται τοῦναντίον· ὅταν γὰρ πολὺ λίαν ἀθροισθῇ
 τὸ θερμὸν μὴ ἐκπνεόντων, τότε δέονται τῆς
 ἀναπνοῆς· ἀναγκαῖον δ' εἰσπνεύσαντας ἀναπνεῖν.
 ἀλεάζοντες δὲ πολλάκις ἀναπνέουσιν, ὡς ἀνα-
 5 ψύξεως χάριν ἀναπνέοντες, ὅτε τὸ λεγόμενον ποιεῖ
 πῦρ ἐπὶ πῦρ.

V. Ἡ δ' ἐν τῷ Τιμαίῳ γεγραμμένη περίωσις
 περί τε τῶν ἄλλων ζώων οὐδὲν διώρικε τίνα
 τρόπον αὐτοῖς ἢ τοῦ θερμοῦ γίνεται σωτηρία, πότε-
 ρον τὸν αὐτὸν ἢ δι' ἄλλην τινὰ αἰτίαν· εἰ μὲν γὰρ
 10 μόνοις τὸ τῆς ἀναπνοῆς ὑπάρχει τοῖς πεζοῖς, λε-
 κτέον τὴν αἰτίαν τοῦ μόνοις· εἰ δὲ καὶ τοῖς ἄλλοις,
 ὁ δὲ τρόπος ἄλλος, καὶ περὶ τούτου διοριστέον,
 εἴπερ δυνατόν ἀναπνεῖν πᾶσιν.

Ἔτι δὲ καὶ πλασματώδης ὁ τρόπος τῆς αἰτίας.
 ἐξιόντος γὰρ ἔξω τοῦ θερμοῦ διὰ τοῦ στόματος,
 τὸν περιέχοντα ὠθούμενον ἀέρα φερόμενον ἐμ-
 15 πίπτειν εἰς τὸν αὐτὸν τόπον φησὶ διὰ μανῶν οὐσῶν
 τῶν σαρκῶν, ὅθεν τὸ ἐντὸς ἐξήκει θερμόν, διὰ τὸ
 μηδὲν εἶναι κενὸν ἀντιπερισταμένων ἀλλήλοις·
 θερμανθέντα δὲ πάλιν ἐξιέναι κατὰ τὸν αὐτὸν
 τόπον, καὶ περιωθεῖν εἴσω διὰ τοῦ στόματος τὸν
 ἀέρα τὸν ἐκπίπτοντα θερμόν· καὶ τοῦτο δὴ δια-

ON RESPIRATION, IV.—V.

from experiences of a kind with which we are all familiar. For in high temperatures the hotter we get the more we have to breathe, and with all of us the breath comes faster ; but when the surrounding atmosphere is cold, which contracts and freezes the body, it checks the breath. And yet on the assumption made the air entering from the outside ought to prevent this pressure. But in point of fact the exact opposite occurs ; for when excessive heat is collected by not exhaling, then men need to breathe ; and they can only breathe by inhaling. But when they are hot they breathe rapidly, and they do so in order to get cool, but this according to Democritus's theory would be adding fire to fire.

V. The account given in the *Timæus*^a of the "pushing round" of the air does not explain in the case of animals other than land animals why this conservation of heat occurs in them, nor whether it is for the same reason or for some other ; for if breathing occurs only in land animals, we have to explain why only in them ; but if it does occur with the rest, but its mode of action is different, then we must be definite on this point, whether it is possible for all living creatures to breathe.

Plato's
account of
breathing.
Refutation.

Moreover this kind of cause is really fictitious. For, upon this theory, when the heat passes out through the mouth, the surrounding air is pushed on and falls into the actual place from which the internal heat has passed out "through the flesh which is porous," one substance replacing another because a vacuum is impossible ; when the air has grown hot it passes out again through the same place as before, and pushes the hot air, which falls out, round again through the mouth ;

^a *Tim.* 79 c.

472 b

20 τελεῖν αἰεὶ ποιοῦντας, ἀναπνέοντάς τε καὶ ἐκπνέον-
 τας. συμβαίνει δὲ τοῖς οὕτως οἰομένοις πρότερον
 τὴν ἐκπνοὴν γίνεσθαι τῆς εἰσπνοῆς. ἔστι δὲ
 τοῦναντίον. σημεῖον δέ· γίνεται μὲν γὰρ ἀλλήλοις
 ταῦτα παρ' ἀλλήλα, τελευτῶντες δὲ ἐκπνέουσιν,
 ὥστ' ἀναγκαῖον εἶναι τὴν ἀρχὴν εἰσπνοῆν.

"Ἐτι δὲ τὸ τίνος ἕνεκα ταῦθ' ὑπάρχει τοῖς ζώοις
 25 (λέγω δὲ τὸ ἀναπνεῖν καὶ τὸ ἐκπνεῖν) οὐθὲν
 εἰρήκασιν οἱ τοῦτον τὸν τρόπον λέγοντες, ἀλλ' ὥς
 περὶ συμπτώματός τινος ἀποφαίνονται μόνον.
 καίτοι γε κύρια ταῦθ' ὁρῶμεν τοῦ ζῆν καὶ τελευτᾶν.
 ὅταν γὰρ ἀναπνεῖν μὴ δύνωνται, τότε συμβαίνει
 γίνεσθαι τὴν φθορὰν τοῖς ἀναπνέουσιν. ἔτι δὲ
 30 ἄτοπον τὸ τὴν μὲν τοῦ θερμοῦ διὰ τοῦ στόματος
 ἔξοδον καὶ πάλιν εἴσοδον μὴ λανθάνειν ἡμᾶς, τὴν
 δ' εἰς τὸν θώρακα τοῦ πνεύματος εἴσοδον καὶ
 πάλιν θερμανθέντος ἔξοδον λανθάνειν. ἄτοπον δὲ
 καὶ τοῦ θερμοῦ τὴν ἀναπνοὴν εἴσοδον εἶναι. φαίνε-
 ται γὰρ τοῦναντίον· τὸ μὲν γὰρ ἐκπνεόμενον εἶναι
 35 θερμόν, τὸ δ' εἰσπνεόμενον ψυχρόν. ὅταν δὲ θερμόν
 478 a ᾖ, ἀσθμαίνοντες ἀναπνέουσιν· διὰ γὰρ τὸ μὴ κατα-
 ψύχειν ἱκανῶς τὸ εἰσιὸν πολλάκις τὸ πνεῦμα συμ-
 βαίνει σπάν.

VI. Ἀλλὰ μὴν οὐδὲ τροφῆς γε χάριν ὑποληπτέον
 γίνεσθαι τὴν ἀναπνοήν, ὥς τρεφομένου τῷ πνεύ-
 5 ματι τοῦ ἐντὸς πυρός, καὶ ἀναπνέοντος μὲν ὥσπερ
 ἐπὶ πῦρ ὑπέκκαυμα ὑποβάλλεσθαι, τραφέντος δὲ
 τοῦ πυρός γίνεσθαι τὴν ἐκπνοήν. ταῦτά γὰρ
 ἐροῦμεν πάλιν καὶ πρὸς τοῦτον τὸν λόγον ἅπερ
 πρὸς τοὺς ἔμπροσθεν· καὶ γὰρ ἐπὶ τῶν ἄλλων
 ζώων ἐχρῆν τοῦτο συμβαίνειν ἢ τὸ ἀνάλογον
 10 τούτῳ· πάντα γὰρ ἔχει θερμότητα ζωτικὴν. ἔπειτα

ON RESPIRATION, v.—vi.

and this we continue to do perpetually, inhaling and exhaling. But those who believe this must think that exhalation comes before inhalation. But the opposite is the truth. And here is the proof ; these actions take place alternately, but the last thing men do is to exhale, so that inhalation must be the first action.

Again those who talk in this way have never explained why this happens in living creatures (I mean inhalation and exhalation), but their account suggests that it is a mere accident. And yet we see that it controls life and death ; for when the breathing creatures can no longer breathe, then destruction comes to them. Again, it is remarkable that we should be conscious of the successive exit and entrance of heat through the mouth, but unconscious of the entry of the breath into the chest, and its subsequent exit when it is hot. It is strange if inhalation is the entrance of the hot. For the opposite seems true ; what is exhaled seems to be hot and what is inhaled cool. For when it is hot men breathe hard ; for, because the entering breath does not cool sufficiently, one draws it in often.

VI. Nor can we suppose that breathing is for the sake of nourishment, on the supposition that the internal heat is nourished by breath, and that breathing is supplying fuel to the fire, and that exhalation takes place when the fire is sufficiently fed. For we shall make the same reply to this argument that we made to the previous ones ; for this or something analogous to it should have occurred in the case of the other animals ; for all of them have life-giving

Is breathing
for the sake
of food ?

473 a

καὶ τὸ γίνεσθαι τὸ θερμὸν ἐκ τοῦ πνεύματος τίνα
 χρή τὸν τρόπον λέγειν, πλασματώδες ὄν; μᾶλλον γὰρ
 ἐκ τῆς τροφῆς τοῦτο γινόμενον ὀρώμεν. συμ-
 βαίνει τε κατὰ ταῦτ' ὀφείσθαι τὴν τροφήν καὶ τὸ
 περίττωμα ἀφίεναι· τοῦτο δ' ἐπὶ τῶν ἄλλων οὐχ
 ὀρώμεν γινόμενον.

- 15 VII. Λέγει δὲ περὶ ἀναπνοῆς καὶ Ἐμπεδοκλῆς,
 οὐ μέντοι τίνος γ' ἕνεκα, οὐδὲ περὶ πάντων τῶν
 ζώων οὐδὲν ποιεῖ δηλον, εἴτε ἀναπνέουσιν εἴτε
 μή. καὶ περὶ τῆς διὰ τῶν μυκτῆρων ἀναπνοῆς
 λέγων οἶεται καὶ περὶ τῆς κυρίας λέγειν ἀνα-
 πνοῆς. ἔστι γὰρ καὶ διὰ τῆς ἀρτηρίας ἐκ τῶν
 20 στηθῶν ἢ ἀναπνοή, καὶ ἢ διὰ τῶν μυκτῆρων·
 αὐτοῖς δὲ χωρὶς ἐκείνης οὐκ ἔστιν ἀναπνεῦσαι τοῖς
 μυκτῆρσιν. καὶ τῆς μὲν διὰ τῶν μυκτῆρων γινο-
 μένης ἀναπνοῆς στερισκόμενα τὰ ζῶα οὐδὲν πά-
 σχουσι, τῆς δὲ κατὰ τὴν ἀρτηρίαν ἀποθνήσκουσιν.
 καταχρῆται γὰρ ἡ φύσις ἐν παρέργῳ τῇ διὰ τῶν
 25 μυκτῆρων ἀναπνοῇ πρὸς τὴν ὁσφρήσιν ἐν ἐνίοις
 τῶν ζώων· διόπερ ὁσφρήσεως μὲν σχεδὸν μετέχει
 πάντα τὰ ζῶα, ἔστι δ' οὐ πᾶσι τὸ αὐτὸ αἰσθητή-
 473 b ριον. εἴρηται δὲ περὶ αὐτῶν ἐν ἑτέροις σαφέστερον.

Γίνεσθαι δὲ φησι τὴν ἀναπνοὴν καὶ ἐκπνοὴν διὰ
 τὸ φλέβας εἶναι τινας, ἐν αἷς ἔνεστι μὲν αἷμα, οὐ
 μέντοι πλήρεις εἰσὶν αἵματος, ἔχουσι δὲ πόρους
 εἰς τὸν ἔξω αἶρα, τῶν μὲν τοῦ σώματος μορίων
 5 ἐλάττους, τῶν δὲ τοῦ αἵματος μείζους· διὸ τοῦ
 αἵματος πεφυκότος κινεῖσθαι ἄνω καὶ κάτω, κάτω
 μὲν φερομένου εἰσρεῖν τὸν αἶρα καὶ γίνεσθαι
 ἀναπνοήν, ἄνω δ' ἰόντος ἐκπίπτειν θύραζε καὶ
 γίνεσθαι τὴν ἐκπνοήν, παρειαῶν τὸ συμβαίνον
 ταῖς κλειψύδραις.

ON RESPIRATION, VI.—VII.

heat. Again, this arising of heat from the breath, being fictitious, how can we explain it? For we see that this arises far more from food. It would follow that the animal would receive nourishment, and discharge waste product in the same way; and this does not seem to be true in other cases.

VII. Empedocles also discusses breathing, but not its purpose, nor does he clear up the question as applied to all living creatures, whether they breathe or not. Also when he speaks of breathing through the nostrils, he thinks that he is speaking of breathing in its proper sense. But, besides the breathing through the nostrils, there is also breathing from the chest through the windpipe; without the latter no breathing through the nostrils would be possible. Again animals deprived of breathing through the nostrils do not seem to suffer for it, but when they lose their breathing through the windpipe they die. Nature employs this breathing through the nostrils for a subsidiary purpose in some animals—for smelling; this is why nearly all animals share a sense of smell, but they have not all the same sense organ. A more detailed account of this is given in other works.^a

But Empedocles says that inhalation and exhalation occur because there are certain veins, which contain some blood but are not full of blood, but have openings to the air outside, smaller than the parts of the body, but large enough for air; because it is the nature of blood to move up and down, when it is carried down the air flows in and constitutes breathing, but, when it rises, the air is driven out, and exhalation takes place, comparing it with what happens in water-clocks.

^a Cf. *De An.* iii., 421 a 10, *De Sens.* 443 a 4, 444 b 7-15.

ARISTOTLE

473 b

ὧδε δ' ἀναπνεῖ πάντα καὶ ἐκπνεῖ. πᾶσι λίφαιμοι
 10 σαρκῶν σύριγγες πύματον κατὰ σῶμα τέτανται,
 καὶ σφιν ἐπὶ στομίοις πυκναῖς τέτρηνται ἄλλοξιν
 ῥινῶν ἔσχατα τέθρα διαμπερές, ὥστε φόνον μὲν
 κεύθειν, αἰθέρι δ' εὐπορίην διόδοισι τετμῆσθαι.
 ἔνθεν ἔπειθ' ὁπόταν μὲν ἀπαῖξῃ τέρεν αἷμα,
 15 αἰθήρ παφλάζων καταβήσεται οἷδατι μάργω,
 εὔτε δ' ἀναθρώσκει, πάλιν ἐκπνεῖ, ὥσπερ ὅταν
 παῖς

κλεψύδρην παίζησι δι' εὐπετέος χαλκοῖο.
 εὔτε μὲν αὐλοῦ πορθμὸν ἐπ' εὐειδεῖ χερὶ θείσα
 εἰς ὕδατος βάπτῃσι τέρεν δέμας ἀργυφέοιο,
 20 οὐ τότε' ἐς ἄγγος δ' ὄμβρος ἐσέρχεται, ἀλλὰ μιν
 εἵργει

ἀέρος ὄγκος ἔσωθε πεσῶν ἐπὶ τρήματα πυκνά,
 εἰσόκ' ἀποστεγάσῃ πυνικὸν ῥόον· αὐτὰρ ἔπειτα
 πνεύματος ἐλλείποντος ἐσέρχεται αὖξιμον ὕδωρ.
 ὥς δ' αὐτως ὅθ' ὕδωρ μὲν ἔχει κατὰ βένθεα
 χαλκοῦ

25 πορθμοῦ χωσθέντος βροτέῳ χροῖ ἡδὲ πόροιο,
 αἰθήρ δ' ἐκτὸς ἔσω λελιημένος ὄμβρον ἐρύκει
 ἀμφὶ πύλας ἰσθμοῖο δυσηχέος, ἄκρα κρατύνων,
 474 a εἰσόκε χερὶ μεθῇ· τότε δ' αὖ πάλιν, ἔμπαλιν ἢ
 πρίν,

πνεύματος ἐμπύπτοντος ὑπεκθέει αὖξιμον ὕδωρ.
 ὥς δ' αὐτως τέρεν αἷμα κλαδασσόμενον διὰ γυλίων
 ὁππότε μὲν παλίνορσον ἐπαῖξει μυχόνδε,
 6 αἰθέρος εὐθὺς ῥεῦμα κατέρχεται οἷδατι θύον,
 εὔτε δ' ἀναθρώσκη, πάλιν ἐκπνεῖ ἴσον ὀπίσσω.

Λέγει μὲν οὖν ταῦτα περὶ τοῦ ἀναπνεῖν, ἀναπνεῖ
 δ', ὥσπερ εἵπομεν, τὰ φανερώς ἀναπνέοντα διὰ τῆς

ON RESPIRATION, vii.

"Thus all things breathe in and out. All men have bloodless pipes of flesh stretching throughout the body, and these are pierced at their ends with many passages right through the ends of the nostrils, such that the blood is covered in them, but they give an easy passage to the air. Now whenever the gentle blood retreats, the rushing air will descend with raging tide, but when the blood leaps up again, the air again blows out, just as when a maid plays with a water-clock of gleaming bronze. When placing a shapely finger on the channel of the tube she dips the delicate body into water silver white, not then does the stream flow into the vessel, but the press of the air from within falling on the crowded holes checks it, until she sets free the rapid stream. Then the air gives way and the swelling water enters. So in the same way, when the water lies in the depths of the bronze vessel, the passage and channel being blocked by the human hand, the air outside craving entrance keeps the water back about the gates of the resounding channel, holding fast its extremities, until the maid lets go with the hand; then again, in the opposite way, as the air rushes in, the swelling water flows out. In just this way the gentle blood coursing through the limbs, whenever it retreats back again to its recesses, at once a stream of air flows in with a rush, but when the blood leaps again the air flows back again as before."

This is what Empedocles has to say about breathing, but, as we have said, creatures whose breathing can be seen, breathe through the windpipe, and also

Refutation
of Empe-
docles.

474 a

ἀρτηρίας, διὰ τε τοῦ στόματος ἅμα καὶ διὰ τῶν
 10 μυκτήρων. ὥστ' εἰ μὲν περὶ ταύτης λέγει τῆς
 ἀναπνοῆς, ἀναγκαῖον ζητεῖν πῶς ἐφαρμόσει ὁ
 εἰρημένος λόγος τῆς αἰτίας· φαίνεται γὰρ τούναν-
 τίον συμβαῖνον. ἄραντες μὲν γὰρ τὸν τόπον,
 καθάπερ τὰς φύσας ἐν τοῖς χαλκείοις, ἀναπνέουσιν·
 αἶρειν δὲ τὸ θερμὸν εὐλογον, ἔχειν δὲ τὸ αἷμα τὴν
 15 τοῦ θερμοῦ χώραν· συνιζάνοντες δὲ καὶ καταπνί-
 γοντες, ὥσπερ ἐκεῖ τὰς φύσας, ἐκπνέουσιν. πλὴν
 ἐκεῖ μὲν οὐ κατὰ ταῦτόν εἰσδέχονται τε τὸν ἀέρα
 καὶ πάλιν ἐξιᾶσιν, οἱ δ' ἀναπνέοντες κατὰ ταῦτόν.
 εἰ δὲ περὶ τῆς κατὰ τοὺς μυκτήρας λέγει μόνης,
 πολὺ διημάρτηκεν· οὐ γὰρ ἔστιν ἀναπνοὴ μυκτήρων
 20 ἴδιος, ἀλλὰ παρὰ τὸν αὐλῶνα τὸν περὶ τὸν γαρ-
 γεῶνα, ἥ τὸ ἔσχατον τοῦ ἐν τῷ στόματι οὐρανοῦ,
 συντετρημένων τῶν μυκτήρων χωρεῖ τὸ μὲν ταύτη
 τοῦ πνεύματος, τὸ δὲ διὰ τοῦ στόματος, ὁμοίως
 εἰσιόν τε καὶ ἐξιόν. τὰ μὲν οὖν παρὰ τῶν ἄλλων
 εἰρημένα περὶ τοῦ ἀναπνεῖν τοιαύτας καὶ τοσαύτας
 ἔχει δυσχερείας.

25 VIII. Ἐπεὶ δὲ εἴρηται πρότερον ὅτι τὸ ζῆν καὶ
 ἡ τῆς ψυχῆς ἕξις μετὰ θερμότητός τινός ἐστιν·
 οὐδέ γὰρ ἡ πέψις, δι' ἧς ἡ τροφή γίνεται τοῖς
 ζώοις, οὔτ' ἀνευ ψυχῆς οὔτ' ἀνευ θερμότητός ἐστιν·
 πυρὶ γὰρ ἐργάζεται πάντα. διόπερ ἐν ᾧ πρώτῳ
 τόπῳ τοῦ σώματος καὶ ἐν ᾧ πρώτῳ τοῦ τόπου
 30 τούτου μορίῳ τὴν ἀρχὴν ἀναγκαῖον εἶναι τὴν
 τοιαύτην, ἐνταῦθα καὶ τὴν πρώτην τὴν θρεπτικὴν

474 b ψυχὴν ἀναγκαῖον ὑπάρχειν. οὗτος δ' ἐστὶν ὁ
 μέσος τόπος τοῦ τε δεχομένου τὴν τροφήν καὶ
 καθ' ὃν ἀφίησι τὸ περίττωμα. τοῖς μὲν οὖν
 ἀναίμοις ἀνώνυμον, τοῖς δ' ἐναίμοις ἡ καρδία

ON RESPIRATION, VII.—VIII.

through the mouth and through the nostrils. So that, if he is talking of breathing in this sense, he must consider how what he has said of the cause will fit in ; for it is clear that just the opposite happens. When men breathe they raise the region (the chest), just like the bellows in a forge ; it is quite natural for heat to raise it, and the blood occupies the place of heat ; but when they are settling it down and cutting it off, as in the other case with the bellows, they exhale. But in the other case they do not admit and expel the air in the same way, but those who breathe do. But if he is speaking of breathing by the nostrils only, he is guilty of a grave error. For breathing is not peculiar to the nostrils, but the breath in this region also travels by the channel about the uvula, where the roof of the mouth ends, and, as the nostrils are perforated, part of the breath travels by this channel, and part by the mouth, both when entering and when going out. The accounts given of breathing by the other philosophers present many difficulties of this kind.

VIII. We have said before that life and the condition of the soul depend to some extent upon heat ; for digestion by which means animals assimilate their food cannot take place apart from the soul and heat ; for all this work is done by heat. Therefore in that region of the body which is first, and in the first part of that region in which this principle must exist, there the primary nutritive soul must exist. This is the region midway between that which receives the food and that which discharges the waste product. It has no name in the bloodless animals, but in animals

Aristotle's
views.
Bodily heat.

474 b

τοῦτο τὸ μόριόν ἐστιν. ἡ τροφή μὲν γὰρ ἐξ ἧς
 ἤδη γίνεται τὰ μόρια τοῖς ζώοις, ἡ τοῦ αἵματος
 φύσις ἐστίν. τοῦ δ' αἵματος καὶ τῶν φλεβῶν τὴν
 αὐτὴν ἀρχὴν ἀναγκαῖον εἶναι· θατέρου γὰρ ἕνεκα
 θατερόν ἐστιν, ὡς ἀγγεῖον καὶ δεκτικόν. ἀρχὴ δὲ
 τῶν φλεβῶν ἡ καρδία τοῖς ἐναίμοις· οὐ γὰρ διὰ
 ταύτης, ἀλλ' ἐκ ταύτης ἡρτημέναι πᾶσαι τυγχά-
 νουσιν. δῆλον δ' ἡμῖν τοῦτο ἐκ τῶν ἀνατομῶν.

- 10 Τὰς μὲν οὖν ἄλλας δυνάμεις τῆς ψυχῆς ἀδύνατον
 ὑπάρχειν ἄνευ τῆς θρεπτικῆς (δι' ἣν δ' αἰτίαν,
 εἴρηται πρότερον ἐν τοῖς περὶ ψυχῆς), ταύτην δ'
 ἄνευ τοῦ φυσικοῦ πυρός· ἐν τούτῳ γὰρ ἡ φύσις
 ἐμπεπύρευκεν αὐτήν. φθορὰ δὲ πυρός, ὥσπερ
 εἴρηται πρότερον, σβέσις καὶ μάρανσις. σβέσις
 15 μὲν ἡ ὑπὸ τῶν ἐναντίων· διόπερ ἀθρόον τε ὑπὸ
 τῆς τοῦ περιέχοντος ψυχρότητος, καὶ θάπτον ὅτι
 σβέννυται διασπώμενον. αὕτη μὲν οὖν ἡ φθορὰ
 βίαιος ὁμοίως ἐπὶ τῶν ἐμψύχων καὶ τῶν ἀψύχων
 ἐστίν· καὶ γὰρ ὄργανοις διαιρουμένου τοῦ ζώου,
 καὶ πηγνυμένου διὰ ψύχους ὑπερβολήν, ἀποθνή-
 20 σκουσιν. ἡ δὲ μάρανσις διὰ πλήθους θερμότητος·
 καὶ γὰρ ἂν ὑπερβάλλῃ τὸ περίξ θερμόν, καὶ τροφήν
 ἐὰν μὴ λαμβάνῃ, φθείρεται τὸ πυρούμενον, οὐ
 ψυχόμενον ἀλλὰ μαραινόμενον. ὥστ' ἀνάγκη γίνε-
 σθαι κατὰψυξιν, εἰ μέλλει τεύξεσθαι σωτηρίας·
 τοῦτο γὰρ βοηθεῖ πρὸς ταύτην τὴν φθοράν.

- 25 IX. Ἐπεὶ δὲ τῶν ζώων τὰ μὲν ἐνυδρα, τὰ δ'
 ἐν τῇ γῇ ποιεῖται τὴν διατριβήν, τούτων τοῖς μὲν
 μικροῖς πάμπαν καὶ τοῖς ἀναίμοις ἡ γινομένη ἐκ
 τοῦ περιέχοντος ἢ ὕδατος ἢ ἀέρος ψύξις ἱκανὴ
 πρὸς τὴν βοήθειαν τῆς φθορᾶς ταύτης· μικρὸν γὰρ
 ἔχοντα τὸ θερμόν μικρὰς δέονται τῆς βοηθείας.

ON RESPIRATION, VIII.—IX.

with blood this part is the heart. The nature of the blood supplies the food from which the parts in animals grow. But the source of the blood and the veins must be the same ; for the one exists for the sake of the other, as its vessel and receiver. But in the animals with blood the heart is the source of the veins ; for not merely do the veins go through the heart, but they actually proceed from it. This of course is proved by dissection.

The other functions of the soul cannot exist without the nutritive (the reason for this has been discussed in my work *On the Soul*),^a nor can that exist without natural heat. For it is in this that nature has fired it. But the destruction of fire, as has been said before, is due to either quenching or dying out. Quenching is due to opposites ; thus it is quenched by the coldness of the surrounding air, even when it is a mass of flame, and even more quickly when scattered. Now this violent extinction takes place equally in creatures with and without soul ; for when the living creature is dissected by instruments, and is frozen by excess of cold, it dies. But withering is due to excess of heat ; for if the surrounding heat is excessive, unless it receives food, the burning object dries, not because it grows cold, but by dying out. So then, if it is to survive, a cooling must take place ; for this protects it against destruction in this way.

IX. But since some living creatures spend their lives in water, and others on land, in the case of those which are bloodless and very small the cooling due to the surrounding envelope—whether water or air—is sufficient to protect them against destruction of this kind ; for as they contain little heat they need but

Breathing
and life.

^a *De An.* 411 b 18, 413 b 1.

474 b

30 διὸ καὶ βραχύβια σχεδὸν πάντα τὰ τοιαῦτ' ἐστίν·
 ἐπ' ἀμφοτέρα γὰρ μικρᾶς ὄντα τυγχάνει ῥοπῆς.
 475 a ὅσα δὲ μακροβιώτερα τῶν ἐντόμων (ἄναιμα γάρ
 ἐστὶ πάντα τὰ ἔντομα), τούτοις ὑπὸ τὸ διάζωμα
 διέσχισται, ὅπως διὰ λεπτοτέρου ὄντος τοῦ ὑμέ-
 νος ψύχεται· μᾶλλον γὰρ ὄντα θερμὰ πλείονος δεῖται
 τῆς καταψύξεως, οἷον αἱ μέλιτται (τῶν γὰρ μελι-
 5 τῶν ἔναια ζῶσι καὶ ἑπτὰ ἔτη) καὶ τᾶλλα δὲ ὅσα
 βομβεῖ, οἷον σφήκες καὶ μηλολόμβαι καὶ τέττιγες.
 καὶ γὰρ τὸν ψόφον ποιοῦσι πνεύματι, οἷον ἀσθμαί-
 νοντα· ἐν αὐτῷ γὰρ τῷ ὑποζώματι, τῷ ἐμφύτῳ
 πνεύματι αἶροντι καὶ συνίζοντι, συμβαίνει πρὸς
 10 τὸν ὑμένα γίνεσθαι τρίψιν· κινουσί γὰρ τὸν τόπον
 τοῦτον, ὥσπερ τὰ ἀναπνέοντα ἔξωθεν τῷ πλεύμονι
 καὶ οἱ ἰχθύες τοῖς βραγχίοις. παραπλήσιον γὰρ
 συμβαίνει καὶ εἴ τις τινα τῶν ἀναπνεόντων πνίγοι,
 τὸ στόμα κατασχών· καὶ γὰρ ταῦτα ποιήσει τῷ
 πλεύμονι τὴν ἄρσιν ταύτην. ἀλλὰ τούτοις μὲν
 15 οὐχ ἱκανὴν ἢ τοιαύτη ποιεῖ κίνησις κατάψυξιν,
 ἐκείνοις δ' ἱκανήν. καὶ τῇ τρίψει τῇ πρὸς τὸν
 ὑμένα ποιοῦσι τὸν βόμβον, ὥσπερ λέγομεν, οἷον
 διὰ τῶν καλάμων τῶν τετρυνημένων τὰ παιδία,
 ὅταν ἐπιθῶσιν ὑμένα λεπτόν. διὰ γὰρ τοῦτο καὶ
 τῶν τεττίγων οἱ ἄδοντες ἄδουσιν· θερμότεροι γὰρ
 20 εἰσι, καὶ ἔσχισται αὐτοῖς ὑπὸ τὸ ὑπόζωμα· τοῖς
 δὲ μὴ ἄδουσι τοῦτ' ἐστὶν ἄσχιςτον.

Καὶ τῶν ἐναίμων δὲ καὶ πλεύμονα ἔχόντων,
 ὀλίγαίμων δ' ἔχόντων καὶ σομφόν, ἔνια διὰ τοῦτο
 πολὺν χρόνον δύνανται ἀπνευστί ζῆν, ὅτι ὁ πλεύμων
 ἄρσιν ἔχει πολλήν, ὀλίγον ἔχων τὸ αἷμα καὶ τὸ
 25 ὑγρόν· ἢ γὰρ οἰκεία κίνησις ἐπὶ πολὺν χρόνον

ON RESPIRATION, IX.

little protection. For this reason nearly all creatures of this kind are short-lived ; for they have but little margin in either direction. But all the insects that are long-lived (for all insects are bloodless) have a division under the mid-region, so that the membrane there being thinner they may be cooled ; for being more hot by nature they need more cooling ; such insects as bees (for some bees live as long as seven years), and all the buzzing animals such as wasps and cockchafers and cicalas. For they produce the buzzing sound by breath, as though they were breathing hard ; for in the mid-region itself, as the breath residing therein rises and falls, a rubbing takes place against the membrane ; for they move this region, just as those animals which draw their breath from the outside do with the lung, and fishes with their gills. It is similar to what would happen if one throttled one of the breathing animals, by pinching its mouth ; for this will produce a rise in the lungs. But for the breathing animals such movement does not produce sufficient cooling, but it is enough for the others. They produce the buzzing by rubbing against the membrane, as we say, just as boys do through reeds pierced with holes, when they have put a thin membrane over them. This is how those of the cicalas which chirrup do so, for they are warmer creatures, and have a division under the midriff ; but in those which do not sing there is no division.

Of those animals which have both blood and lung, but whose lung has little blood and is porous, some can for this reason live for a long time without breathing, because the lung is capable of considerable expansion, having but little blood and moisture ; for its own movement is sufficient to keep it cool for a long time.

475 a διαρκεῖ καταψύχουσα. τέλος δ' οὐ δύναται, ἀλλ' ἀποπνίγεται μὴ ἀναπνεύσαντα, καθάπερ εἴρηται καὶ πρότερον· τῆς γὰρ μαράνσεως ἢ διὰ τὸ μὴ ψύχεσθαι φθορὰ καλεῖται πνίξις, καὶ τὰ οὕτω φθειρόμενα ἀποπνίγεσθαι φαμεν.

“Ὅτι δ' οὐκ ἀναπνεῖ τὰ ἔντομα τῶν ζώων, εἴρη-
80 ται μὲν καὶ πρότερον, φανερόν δέ καὶ ἐπὶ τῶν
μικρῶν ἐστὶ ζώων, οἷον μυιῶν καὶ μελιττῶν· ἐν
475 b γὰρ τοῖς ὑγροῖς πολὺν χρόνον ἀνανήχεται, ἂν μὴ
λίαν ἢ θερμόν ἢ ψυχρόν. καίτοι τὰ μικρὰν ἔχοντα
δύναμιν πυκνότερον ζητεῖ ἀναπνεῖν. ἀλλὰ φθεί-
ρεται ταῦτα καὶ λέγεται ἀποπνίγεσθαι πληρου-
μένης τῆς κοιλίας καὶ φθειρομένου τοῦ ἐν τῷ
5 ὑποζώματι θερμοῦ.¹ διὸ καὶ ἐν τῇ τέφρᾳ χρο-
νίσθέντα ἀνίσταται. καὶ τῶν ἐν τῷ ὑγρῷ δέ ζώντων
ὅσα ἀναιμα, πλείω χρόνον ζῇ ἐν τῷ ἀέρι τῶν ἐναί-
μων καὶ δεχομένων τὴν θάλατταν, οἷον τῶν ἰχθύων·
διὰ γὰρ τὸ ὀλίγον ἔχειν τὸ θερμόν ὃ ἀῆρ ἱκανός
ἐστὶν ἐπὶ πολὺν χρόνον καταψύχειν, οἷον τοῖς τε
10 μαλακοστράκοις καὶ τοῖς πολύποσιν. οὐ μὲν εἰς
τέλος γε διαρκεῖ πρὸς τὸ ζῆν, διὰ τὸ ὀλιγόθερμα
εἶναι, ἐπεὶ καὶ τῶν ἰχθύων οἱ πολλοὶ ζῶσιν ἐν τῇ
γῇ, ἀκινήτιζοντες μέντοι, καὶ εὐρίσκονται ὀρυτ-
τόμενοι. ὅσα γὰρ ἢ μῆδ' ὅλως ἔχει πλεύμονα ἢ
ἀναιμον, ἐλαττονάκις δέεται καταψύξεως.

15 X. Περὶ μὲν οὖν τῶν ἀναιμόνων, ὅτι τοῖς μὲν ὃ
περιέχων ἀῆρ τοῖς δὲ τὸ ὑγρὸν βοηθεῖ πρὸς τὴν
ζωήν, εἴρηται· τοῖς δ' ἐναίμοις καὶ τοῖς ἔχουσι
καρδίαν, ὅσα μὲν ἔχει πλεύμονα, πάντα δέχεται
τὸν ἀέρα καὶ τὴν κατάψυξιν ποιεῖται διὰ τοῦ
ἀναπνεῖν καὶ ἐκπνεῖν. ἔχει δὲ πλεύμονα τὰ τε
20 ζωοτοκοῦντα ἐν αὐτοῖς καὶ μὴ θύραζε μόνον (τὰ

ON RESPIRATION, IX.—X.

But at last it is unable to go on, and is choked through not breathing, as has been said before. The destruction which is due to withering owing to lack of cooling is called choking, and we say that animals which die in this way are choked.

We have stated before that among living creatures insects do not breathe, and this is evident in the case of the small ones, such as flies and bees ; for they can swim in water for a long time, if it is neither too hot nor too cold. Yet those animals which have but little strength try to breathe more frequently. But these are destroyed and are said to be choked, when the belly is filled and the heat in the midriff is exhausted. For the same reason they revive if they are put for some time in ashes. Of all the animals which live in water the bloodless ones can live in the air for a longer time than the animals which have blood and admit the water like fishes ; for because they contain only a small quantity of heat, the air can keep them cool for a considerable time, as with the soft-shelled creatures and the cuttlefish. It does not enable them to live permanently thus because they contain but little heat, since most of the fishes live also in the earth, though they cannot move and are found by digging. For those which have either no lung, or a lung without blood, require cooling less often.

X. We have stated that in the case of the bloodless animals the surrounding air in some cases, and the water in others, are aids to life ; but in the case of animals with blood and those having a heart, all that have lungs admit the air and achieve cooling by breathing in and out. All viviparous animals have lungs—if that is they are viviparous internally and

Breathing
in warm-
blooded
animals.

475 b

γὰρ σελάχη ζωοτοκεῖ μέν, ἀλλ' οὐκ ἐν αὐτοῖς) καὶ τῶν ὠοτοκούντων τὰ τε πτερυγωτά, οἷον ὄρνιαθες, καὶ τὰ φολιδωτά, οἷον χελῶναι καὶ σαῦραι καὶ ὄφεις. ἐκεῖνα μὲν οὖν ἔναιμιον, τούτων δὲ τὰ
 25 πλεῖστα τὸν πλεύμονα ἔχει σομφόν. διὸ καὶ τῇ ἀναπνοῇ χρῆται μανότερον, ὥσπερ εἴρηται καὶ πρότερον.

Χρῆται δὲ πάντα καὶ ὅσα διατρίβει καὶ ποιεῖται τὸν βίον ἐν τοῖς ὕδασι, οἷον τὸ τῶν ὕδρων γένος καὶ βατράχων καὶ κροκοδείλων καὶ ἐμύδων καὶ χελῶναι αἱ τε θαλάττιαι καὶ αἱ χερσαῖαι καὶ
 80 φῶκαι· ταῦτα γὰρ πάντα καὶ τὰ τοιαῦτα καὶ τίκτει ἐν τῷ ξηρῷ, καὶ καθεύδει ἢ ἐν τῷ ξηρῷ, ἢ ἐν τῷ
 476 a ὕγρῳ ὑπερέχοντα τὸ στόμα διὰ τὴν ἀναπνοήν. ὅσα δὲ βράγχια ἔχει, πάντα καταψύχεται δεχόμενα τὸ ὕδωρ· ἔχει δὲ βράγχια τὸ τῶν καλουμένων σελαχῶν γένος καὶ τῶν ἄλλων ἀπόδων. ἀποδες δ' οἱ ἰχθύες πάντες· καὶ γὰρ αὐτὸς ἔχει, καθ' ὁμοιότητα
 5 τῶν πτερυγίων λέγουσιν.¹ τῶν δὲ πόδας ἔχόντων ἐν ἔχει βράγχιον μόνον τῶν τεθεωρημένων ὁ καλούμενος κορδύλος. ἅμα δὲ πλεύμονα καὶ βράγχια οὐδὲν ὥπται πω ἔχον. αἴτιον δ' ὅτι ὁ μὲν πλεύμων τῆς ὑπὸ τοῦ πνεύματος καταψύξεως ἕνεκὲν ἐστίν (ἔοικε δὲ καὶ τοῦνομα εἰληφέναι ὁ πνεύμων διὰ
 10 τὴν τοῦ πνεύματος ὑποδοχήν), τὰ δὲ βράγχια πρὸς τὴν ἀπὸ τοῦ ὕδατος κατάψυξιν· ἐν δ' ἐφ' ἐν ὄργανον χρήσιμον, καὶ μία κατάψυξις ἱκανὴ πᾶσιν. ὥστ' ἐπεὶ μάτην οὐδὲν ὀρώμεν ποιούσαν τὴν φύσιν, δυοῖν δ' ὄντοιιν θάτερον ἂν ἦν μάτην, διὰ τοῦτο τὰ μὲν
 15 ἔχει βράγχια τὰ δὲ πνεύμονα, ἅμφω δ' οὐδέν.

XI. Ἐπεὶ δὲ πρὸς μὲν τὸ εἶναι τροφῆς δεῖται τῶν ζώων ἕκαστον, πρὸς δὲ τὴν σωτηρίαν τῆς
 454

ON RESPIRATION, x.—xi.

not externally (for the shark tribe is viviparous, but not in themselves) and among the oviparous the winged creatures such as birds, and the scaly creatures such as tortoises, lizards and snakes. Both these classes have lungs containing blood, but in the latter class the lung is usually porous. Consequently they breathe less often, as has been said before.

But all animals which live and have their being in water breathe, such as the genera watersnake, frog, crocodile, freshwater tortoise, and both sea and land tortoises and seals. All these bring forth their young on dry land, and either sleep on dry land, or in water with their mouth above the surface for breathing. But those that have gills are all cooled by admitting water; the tribe of so-called sharks and other legless beasts all have gills. All the fishes are legless; and what they have in the place of feet get their name (*πτερύγιον*) from their similarity to wings (*πτέρυξ*). Of animals with feet one only has gills so far as we have observed, the water newt. But so far no creature has been observed with both lungs and gills. The reason is that the lung exists for the purpose of cooling the breath (its name—*πνεύμων*—seems due to its being a receptacle for breath—*πνεύμα*); but the gills assist cooling by water; one organ avails for one purpose, and one cooling is enough for all. Since, then, we know that nature does nothing in vain, and that if there were two organs for the purpose one would be useless, for this reason some creatures have gills and some lungs, but none of them have both.

XI. But since every animal requires food for its existence, and cooling for its preservation, nature uses

Aquatic
animals.

The mouth
serves a
double

¹ *ἐχούσιν* B.

476 a

καταψύξεως, τῷ αὐτῷ ὀργάνῳ χρήται πρὸς ἄμφω
ταῦτα ἢ φύσις, καθάπερ ἐνίοις τῇ γλώττῃ πρὸς τε
20 τοὺς χυμοὺς καὶ πρὸς τὴν ἐρμηνείαν, οὕτω τοῖς
ἔχουσι τὸν πλεύμονα τῷ καλουμένῳ στόματι πρὸς
τε τὴν τῆς τροφῆς ἐργασίαν καὶ τὴν ἐκπνοὴν καὶ
τὴν ἀναπνοήν. τοῖς δὲ μὴ ἔχουσι πνεύμονα μηδ'
ἀναπνέουσι τὸ μὲν στόμα πρὸς τὴν ἐργασίαν τῆς
τροφῆς, πρὸς δὲ τὴν κατάψυξιν τοῖς δεομένοις
25 καταψύξεως ἢ τῶν βραγχίων ὑπάρχει φύσις. πῶς
μὲν οὖν ἢ τῶν εἰρημένων ὀργάνων δυνάμεις ποιεῖ
τὴν κατάψυξιν, ὕστερον ἐροῦμεν. πρὸς δὲ τὸ τὴν
τροφὴν μὴ διακωλύειν παραπλησίως τοῖς τ' ἀνα-
πνέουσι συμβαίνει καὶ τοῖς δεχομένοις τὸ ὑγρόν·
οὔτε γὰρ ἀναπνέοντες ἅμα καταδέχονται τὴν τρο-
30 φήν· εἰ δὲ μὴ, συμβαίνει πνίγεσθαι παρεισιούσης
τῆς τροφῆς ἢ τῆς ὑγρᾶς ἢ τῆς ξηρᾶς ἐπὶ τὸν
πνεύμονα διὰ τῆς ἀρτηρίας· πρότερον γὰρ κεῖται
ἢ ἀρτηρία τοῦ οἰσοφάγου, δι' οὗ ἢ τροφή πορεύεται
εἰς τὴν καλουμένην κοιλίαν. τοῖς μὲν οὖν τετράποσι
καὶ ἐναίμοις ἔχει ἢ ἀρτηρία οἷον πῶμα τὴν ἐπι-
476 b γλωττίδα· τοῖς δ' ὄρنيσι καὶ τῶν τετραπόδων τοῖς
ὠτοκόκοις οὐκ ἔπεστιν, ἀλλὰ τῇ συναγωγῇ τὸ αὐτὸ
ποιοῦσιν· δεχόμενα γὰρ τὴν τροφήν τὰ μὲν συνάγει,
τὰ δ' ἐπιτίθησι τὴν ἐπιγλωττίδα. προελθούσης δὲ
τὰ μὲν ἐπαίρει, τὰ δὲ διοίγει καὶ καταδέχεται τὰ
5 πνεῦμα πρὸς τὴν κατάψυξιν. τὰ δ' ἔχοντα βράγχια,
ἀφέντα διὰ τούτων τὸ ὑγρόν, διὰ τοῦ στόματος
καταδέχεται τὴν τροφήν· ἀρτηρίαν μὲν γὰρ οὐκ
ἔχουσιν, ὥστε ταύτῃ μὲν οὐθέν ἄν βλάπτουιντο ὑπὸ
τῆς τοῦ ὑγροῦ παρεμπτώσεως, ἀλλ' εἰς τὴν κοιλίαν
10 εἰσιόντος. διὸ ταχεῖαν ποιεῖται τὴν ἄφεσιν καὶ
τὴν λήψιν τῆς τροφῆς, καὶ τοὺς ὀδόντας ὀξεῖς
456

ON RESPIRATION, XI.

the same organ for both these purposes ; just in the same way some animals use the tongue both to appreciate flavours and for interpretation, so those animals which have a lung use what is called the mouth both for the work of nourishment and for breathing in and out. But, in those which have no lungs and do not breathe, the mouth is used for the work of nourishment, while the gills can supply naturally the cooling to those which need it. We shall explain later on how the function of the organs mentioned supplies cooling. But, to prevent hindrance to food supply, much the same thing happens to creatures that breathe and to those which admit moisture ; for they do not admit food at the time of breathing ; if they did, they would inevitably be choked by the food, whether dry or wet, entering through the windpipe into the lung ; for the windpipe lies in front of the oesophagus, through which the food passes into what we call the belly. In the four-footed animals with blood the windpipe has a kind of lid called the epiglottis ; but birds and four-footed beasts which are oviparous have not this lid, but they achieve the same result by contraction of the windpipe ; for when receiving food the latter class contracts the windpipe, the former closes the epiglottis. But, as the food continues on its way, the latter class expands the windpipe again, the former opens the epiglottis and admits breath for the purpose of cooling. But those which have gills, discharging water through them, receive food through the mouth ; for they have no windpipe, so that they cannot suffer harm from the water falling into it, but only from its entering the stomach. For this reason they make the discharge and the reception of food rapidly, and

purpose of
breathing
animals.

478 b

ἔχουσι, καὶ καρχαρόδοντες σχεδὸν πάντες εἰσίν· οὐ γὰρ ἐνδέχεται λεαίνειν τὴν τροφήν.

XII. Περί δὲ τὰ κητώδη τῶν ἐνύδρων ἀπορήσειεν ἂν τις, ἔχει δὲ κακεῖνα κατὰ λόγον, οἷον περί τε
 15 τοὺς δελφῖνας καὶ τὰς φαλαίνας, καὶ τῶν ἄλλων ὅσα ἔχει τὸν καλούμενον αὐλόν. ταῦτα γὰρ ἄποδα μὲν ἔστιν, ἔχοντα δὲ πνεύμονα δέχεται τὴν θάλατταν. αἴτιον δὲ τούτου τὸ νῦν εἰρημένον· οὐ γὰρ καταψύξεως ἔνεκεν δέχεται τὸ ὑγρόν. τοῦτο μὲν γὰρ γίνεται αὐτοῖς ἀναπνέουσιν· ἔχουσι γὰρ πλεύ-
 20 μονα. διὸ καὶ καθεύδουσιν ὑπερέχοντα τὸ στόμα, καὶ ῥέγχουσιν οἷ γε δελφῖνες. ἔτι δὲ καὶ ληφθῶσι τοῖς δικτύοις, ταχὺ ἀποπνίγονται διὰ τὸ μὴ ἀναπνεῖν· καὶ ἐπιπολάζοντα φαίνεται τὰ τοιαῦτα ἐπὶ τῆς θαλάττης διὰ τὴν ἀναπνοήν. ἀλλ' ἐπειδὴ ἀναγκαῖον ποιεῖσθαι τὴν τροφήν ἐν ὑγρῷ, ἀναγκαῖον
 25 δεχόμενα τὸ ὑγρὸν ἀφίεναι, καὶ διὰ τοῦτ' ἔχουσι πάντα τὸν αὐλόν· δεξάμενα γὰρ τὸ ὕδωρ, ὥσπερ οἱ ἰχθύες κατὰ τὰ βράγχια, ταῦτα κατὰ τὸν αὐλόν, ἀνασπᾷ τὸ ὕδωρ. σημεῖον δὲ καὶ ἡ θέσις τοῦ αὐλοῦ· πρὸς οὐθέν γὰρ περαίνει τῶν ἐναίμων, ἀλλὰ
 80 πρὸ τοῦ ἐγκεφάλου τὴν θέσιν ἔχει, καὶ ἀφίησι τὸ ὕδωρ. διὰ ταῦτό δὲ τοῦτο δέχεται καὶ τὰ μαλάκια τὸ ὕδωρ καὶ τὰ μαλακόστρακα, λέγω δ' οἷον τοὺς καλουμένους καράβους καὶ τοὺς καρκίνους. καταψύξεως μὲν γὰρ αὐτῶν οὐδὲν τυγχάνει δεόμενον· ὀλιγόθερμον γὰρ ἔστι καὶ ἀναιμόν
 477 a ἕκαστον αὐτῶν, ὥσθ' ἱκανῶς καταψύχεται ὑπὸ τοῦ περιέχοντος ὑγροῦ· ἀλλὰ διὰ τὴν τροφήν, ὅπως μὴ ἅμα δεχομένοις εἰσρέῃ τὸ ὑγρόν. τὰ μὲν οὖν μαλακόστρακα, οἷον οἷ τε καρκίνοι καὶ οἱ κάραβοι, παρὰ τὰ δασέα ἀφιασι τὸ ὕδωρ διὰ τῶν ἐπιπτυγ-

ON RESPIRATION, XI.—XII.

they have sharp teeth, set like a saw in most cases ; for it is impossible for them to chew their food.

XII. A difficulty might arise over the cetaceans among water animals, but they too have a logical explanation, such creatures I mean as dolphins and whales, and all other creatures which have what is called a blowhole. For these have no feet, but have lungs, and yet admit the water. But the reason of this is the one already given ; for they do not admit the moisture for the purpose of cooling. This cooling takes place when they breathe, for they have lungs. This is why they sleep with their mouths above water, and the dolphins at any rate snore. Again, if they are caught in nets, they are quickly choked because they cannot breathe ; and such creatures float on the surface of the water for the purpose of breathing. But since they have to do their feeding in water, they have to admit the water and then discharge it, and this is why they all have a blowhole ; for after having admitted the water they expel it again through the blowhole, just as fishes do through the gills. The position of the blowhole proves this ; for it leads to none of the parts with blood, but is situated in front of the brain, and discharges the water. For exactly the same reason the cephalopoda and crustacea admit water—I mean such creatures as the crayfish and the crab. For none of these happens to need cooling ; for each of these species is of low temperature and bloodless, so that it is sufficiently cooled by the surrounding water ; but the purpose of the blowhole in this case is for feeding, that the water may not flow in at the moment that they are absorbing food. The crustacea, such as crabs and crayfish, discharge the water through the folds by the hairy

The blow-hole in whales, etc.

477 a

5 μάτων, σηπίαι δὲ καὶ πολύποδες διὰ τοῦ κοίλου τοῦ ὑπὲρ τῆς καλουμένης κεφαλῆς. γέγραπται δὲ περὶ αὐτῶν δι' ἀκριβείας μᾶλλον ἐν ταῖς περὶ τῶν ζώων ἱστορίαις. περὶ μὲν οὖν τοῦ δέχεσθαι τὸ ὑγρόν, εἴρηται ὅτι συμβαίνει διὰ κατάψυξιν καὶ διὰ τὸ δεῖν δέχεσθαι τὴν τροφήν ἐκ τοῦ ὑγροῦ τὰ
10 τὴν φύσιν ὄντα τῶν ζώων ἔνυδρα.

XIII. Περὶ δὲ τῆς καταψύξεως, τίνα γίνεται τρόπον τοῖς τ' ἀναπνέουσι καὶ τοῖς ἔχουσι βράγχια, μετὰ ταῦτα λεκτέον. ὅτι μὲν οὖν ἀναπνέουσιν ὅσα πνεύμονα τῶν ζώων ἔχουσι, πρότερον εἴρηται. διὰ
15 τί δὲ τοῦτο τὸ μόριον ἔχουσιν ἔνια, καὶ διὰ τί τὰ ἔχοντα δεῖται τῆς ἀναπνοῆς, αἴτιον τοῦ μὲν ἔχειν ὅτι τὰ τιμιώτερα τῶν ζώων πλείονος τετύχηκε θερμότητος· ἅμα γὰρ ἀνάγκη καὶ ψυχῆς τετυχη-
κέναι τιμιωτέρας· τιμιώτερα γὰρ τὰ τοιαῦτα τῆς φύσεως τῆς τῶν φυτῶν. διὸ καὶ τὰ μάλιστα
20 ἔναιμον ἔχοντα τὸν πνεύμονα καὶ θερμὸν μείζονά τε τοῖς μεγέθεσι, καὶ τό γε καθαρωτάτῳ καὶ πλεί-
στῳ κεκρημένον αἵματι τῶν ζώων ὀρθότατόν ἐστιν ὁ ἄνθρωπος, καὶ τὸ ἄνω πρὸς τὸ τοῦ ὅλου ἄνω ἔχει·
μόνον διὰ τὸ τοιοῦτον ἔχειν τοῦτο τὸ μόριον. ὥστε τῆς οὐσίας καὶ τούτῳ καὶ τοῖς ἄλλοις θετέον αἴτιον
25 αὐτό, καθάπερ ὅτιοῦν ἄλλο τῶν μορίων. ἔχει μὲν οὖν ἔνεκα τούτου. τὴν δ' ἐξ ἀνάγκης καὶ τῆς κινήσεως αἰτίαν καὶ τὰ τοιαῦτα νομίζειν συνεστά-
ναι ζῶα, καθάπερ καὶ μὴ τοιαῦτα πολλὰ συνέστη-
κεν· τὰ μὲν γὰρ ἐκ γῆς πλείονος γέγονεν, οἷον τὸ τῶν φυτῶν γένος, τὰ δ' ἐξ ὕδατος, οἷον τὸ τῶν
30 ἐνύδρων· τῶν δὲ πτηνῶν καὶ πεζῶν τὰ μὲν ἐξ ἀέρος

ON RESPIRATION, XII.—XIII.

parts, but the cuttlefish and polypus through the hollow above the so-called head. I have given a more exact account of these in my *Inquiry into Animals*.^a Concerning the admission of water, then, it has been explained that it is for the purpose of cooling, and because those creatures which naturally live in water must derive their food from the water.

XIII. Next we must explain how this cooling takes place in creatures which breathe and in those which have gills. We have already stated that all living creatures that have lungs breathe. But two questions remain: why some creatures have the organ, and why those that have it need breathing; the reason they possess it is that animals higher in the scale of creation have more heat; for they must at the same time have a more advanced life; they have, for instance, a life more advanced than the plants. So the animals which have a lung with the most blood and heat are greater in size, and that whose blood is purest and in the greatest quantity of all living creatures is the most erect, that is to say man; "up" in his case corresponds to "up" in the whole universe just because he possesses this organ. So that the reason for its existence both in this and in other animals must be assumed, just as in the case of any other parts. It possesses it for this reason. One is bound to suppose that it is by necessity, and for the sake of motion that such creatures are so made, just as there are many that are not so made; for some are made from a larger proportion of earth, such as the genus of plants, and others from water, such as the water animals; but of the winged and land animals some are made from air and some from

The
connexion
between
breathing
and cooling.

^a *Hist. An.* 523 a 30, etc.

477 a

τὰ δ' ἐκ πυρός. ἕκαστα δ' ἐν τοῖς οἰκείοις τόποις ἔχει τὴν τάξιν αὐτῶν.

XIV. Ἐμπεδοκλῆς δ' οὐ καλῶς τοῦτ' εἶρηκε,
 477 b φάσκων τὰ θερμότατα καὶ πῦρ ἔχοντα πλείστον
 τῶν ζώων ἐνυδρα εἶναι, φεύγοντα τὴν ὑπερβολὴν
 τῆς ἐν τῇ φύσει θερμότητος, ὅπως ἐπειδὴ τοῦ
 ψυχροῦ καὶ τοῦ ὑγροῦ ἐλλείπει, κατὰ τὸν τόπον
 ἀνασώζεται ἐναντία ὄντα· θερμὸν γὰρ εἶναι τὸ
 5 ὑγρὸν ἥττον τοῦ αἵρος. ὅλως μὲν οὖν ἄτοπον πῶς
 ἐνδέχεται γενόμενον ἕκαστον αὐτῶν ἐν τῷ ξηρῷ
 μεταβάλλειν τὸν τόπον εἰς τὸ ὑγρὸν· σχεδὸν γὰρ
 καὶ ἄποδα τὰ πλείστα αὐτῶν ἐστίν. ὁ δὲ τὴν ἐξ
 ἀρχῆς αὐτῶν σύστασιν λέγων γενέσθαι μὲν ἐν τῷ
 ξηρῷ φησί, φεύγοντα δ' ἐλθεῖν εἰς τὸ ὑγρὸν. ἔτι
 10 δ' οὐδὲ¹ φαίνεται θερμότερα ὄντα τῶν πεζῶν· τὰ
 μὲν γὰρ ἀναιμα πάντα, τὰ δ' ὀλίγαιμα αὐτῶν
 ἐστίν.

Ἀλλὰ ποῖα μὲν δεῖ λέγειν θερμὰ καὶ ψυχρά, καθ'
 αὐτὰ τὴν ἐπίσκεψιν εἴληφεν· περὶ δ' ἥς αἰτίας
 εἶρηκεν Ἐμπεδοκλῆς, τῇ μὲν ἔχει τὸ ζητούμενον
 λόγον, οὐ μὴν ὃ γε φησὶν ἐκεῖνος ἀληθές. τῶν μὲν
 15 γὰρ ἕξεων τοὺς² τὰς ὑπερβολὰς ἔχοντας οἱ ἐναντίοι
 τόποι καὶ ὥραι σώζουσιν, ἡ δὲ φύσις ἐν τοῖς οἰκείοις
 σώζεται μάλιστα τόποις. οὐ γὰρ ταῦτόν ἢ θ' ὕλη
 τῶν ζώων ἐξ ἥς ἐστὶν ἕκαστον, καὶ αἱ ἕξεις καὶ
 διαθέσεις αὐτῆς. λέγω δ' οἷον εἴ τι ἐκ κηροῦ
 συστήσειεν ἡ φύσις, οὐκ ἂν ἐν θερμῷ θεῖσα δι-
 20 ἔσωσεν, οὐδ' εἴ τι ἐκ κρυστάλλου· ἐφθάρη γὰρ ἂν
 ταχὺ διὰ τοῦναντίον· τήκει γὰρ τὸ θερμὸν τὸ ὑπὸ
 τοῦ ἐναντίου συστάν. οὐδ' εἴ τι ἐξ ἀλὸς ἢ νίτρου
 συνέστησεν, οὐκ ἂν εἰς ὑγρὸν φέρουσα κατέθηκεν·

¹ οὕτε B.² τοὺς om. B.

ON RESPIRATION, XIII.—XIV.

fire. Each has its system in its appropriate element.

XIV. Empedocles is mistaken in saying that for the most part the creatures containing heat or fire live in the water, thereby escaping the excess of heat that lies in their nature, in order that, since they are short of coolness and liquid, they may be saved by their habitat being of an opposite nature ; for liquid is less hot than air. Generally speaking it seems unnatural that each animal born in the dry should change its habitat to the wet ; for most of them have no feet. But he, describing their structure from the beginning, says that they are born on dry land, but that they escape from it and reach the water. Further it is clear that they are not warmer than the land animals ; for some of them are altogether bloodless, and others have only a little blood.

He has examined in detail which of them are entitled to be called hot and which cold ; but as for what Empedocles has said about the cause, in one way his explanation is reasonable, but yet he does not tell the real truth of the matter. For it is opposite places and seasons which preserve them in so far as they have excess of either condition, but their nature is best preserved in their own places ; for the matter from which each species is made is not the same thing as its habits and disposition. What I mean is this : if nature were to make anything out of wax, she would not preserve it by placing it in a hot atmosphere, nor if she had made a thing out of ice ; for it would be rapidly destroyed by its opposite ; for heat destroys that which is constructed from its opposite. Nor if she had made a thing out of salt and nitre would she have taken it and placed it in water ; for

Empedocles
on water
animals.

Empedocles
refuted.

477 b

φθείρει γὰρ τὰ ὑπὸ θερμοῦ καὶ ξηροῦ συστάντα τὸ ὑγρόν. εἰ οὖν ὕλη πᾶσι τοῖς σώμασι τὸ ὑγρόν καὶ
 25 τὸ ξηρόν, εὐλόγως τὰ μὲν ἐξ ὑγροῦ καὶ ψυχροῦ
 συστάντα ἐν ὑγροῖς ἐστί, καὶ εἰ ψυχρά, ἔσται ἐν
 ψυχρῷ, τὰ δ' ἐκ ξηροῦ ἐν ξηρῷ. διὰ τοῦτο τὰ
 δένδρα οὐκ ἐν ὕδατι φύεται, ἀλλ' ἐν τῇ γῇ. καίτοι
 τοῦ αὐτοῦ λόγου ἐστὶν εἰς τὸ ὕδωρ, διὰ τὸ εἶναι
 αὐτὰ ὑπέρξηρα, ὥσπερ τὰ ὑπέρπυρά φησιν ἐκεῖνος·
 30 οὐ γὰρ διὰ τὸ ψυχρὸν ἦλθεν εἰς αὐτό, ἀλλ' ὅτι
 ὑγρόν.

Αἱ μὲν οὖν φύσεις τῆς ὕλης, ἐν οἷωπερ τόπῳ
 εἰσὶ, τοιαῦται οὖσαι τυγχάνουσιν, αἱ μὲν ἐν ὕδατι
 ὑγραί, αἱ δ' ἐν τῇ γῇ ξηραί, αἱ δ' ἐν τῷ ἀέρι θερ-
 478 a μαί. αἱ μέντοι ἔξεις αἱ μὲν ὑπερβάλλουσαι θερ-
 μότητι ἐν ψυχρῷ, αἱ δὲ τῇ ψυχρότητι ἐν θερμῷ
 τιθέμεναι σώζονται μᾶλλον· ἐπανισοῖ γὰρ εἰς τὸ
 μέτριον ὁ τόπος τὴν τῆς ἔξεως ὑπερβολήν. τοῦτο
 b μὲν οὖν δεῖ ζητεῖν ἐν τοῖς οἰκείοις τόποις ἐκάστης
 ὕλης, καὶ κατὰ τὰς μεταβολὰς τῆς κοινῆς ὥρας·
 τὰς μὲν γὰρ ἔξεις ἐνδέχεται τοῖς τόποις ἐναντίας
 εἶναι, τὴν δ' ὕλην ἀδύνατον. ὅτι μὲν οὖν οὐ διὰ
 θερμότητα τῆς φύσεως τὰ μὲν ἐνυδρα τὰ δὲ περὶ
 τῶν ζώων ἐστί, καθάπερ Ἐμπεδοκλῆς φησὶν,
 10 τοσαύτ' εἰρήσθω, καὶ διότι τὰ μὲν οὐκ ἔχει πνεύ-
 μονα τὰ δὲ ἔχει.

XV. Διὰ τί δὲ τὰ ἔχοντα δέχεται τὸν ἀέρα καὶ
 ἀναπνέουσιν, καὶ μάλιστα αὐτῶν ὅσα ἔχουσιν ἔν-
 αιμον, αἷτιον τοῦ μὲν ἀναπνεῖν ὁ πνεύμων σομφὸς
 ὢν καὶ συρίγγων πλήρης. καὶ ἐναιμότατον δὲ
 μάλιστα τοῦτο τὸ μόριον τῶν καλουμένων σπλάγ-
 15 χνων. ὅσα δὲ ἔχει ἔναιμον αὐτό, ταχείας μὲν
 δεῖται τῆς καταψύξεως διὰ τὸ μικρὰν εἶναι τὴν

ON RESPIRATION, XIV.—XV.

water destroys that which is made by heat and dryness. If then the matter of which all bodies are composed consists of wet and dry, naturally that which is made of wet and cold lives in water and, if it is cold, will live in the cold, but what is made of the dry will live in the dry. For this reason trees do not grow in water, but in the earth. Yet on the same theory he would assign them to the water because they are too dry, just as he says of the too fiery. On this theory they would enter water not because it is cold, but because it is wet.

The nature of matter is similar to that in which it lives ; in water live wet things, in earth dry, and in air hot. But as for their conditions those that are excessively hot thrive best in the cold, and those that are excessively cold in the warm ; for their environment best neutralizes the excess of their condition. They must seek this in the places appropriate to each matter, and in accordance with the changes in the ordinary seasons ; for states can be contrary to the place in which they live, but matter never. We have, then, proved sufficiently that it is not because of their natural heat that the water and land creatures are such as Empedocles says, and why some have lungs and some have not.

XV. The reason why those that have lungs admit the air and breathe, and particularly those which have a lung with blood, is that the lung is porous and full of tubes. And this part is more full of blood than any other of the so-called internal organs. All creatures that have this part full of blood need rapid cooling, because the possible variation of the fire in

The
function of
the lung.

478 a

ρόπην τοῦ ψυχικοῦ πυρός, εἶσω δ' εἰσιέναι διὰ παντός διὰ τὸ πλῆθος τοῦ αἵματος καὶ τῆς θερμότητος. ταῦτα δ' ἀμφότερα ὁ μὲν ἄηρ δύναται ῥαδίως ποιεῖν· διὰ γὰρ τὸ λεπτήν ἔχειν τὴν φύσιν
 20 διὰ παντός τε καὶ ταχέως διαδυσόμενος διαψύχει· τὸ δ' ὕδωρ τοῦναντίον. καὶ διότι δὴ μάλιστ' ἀναπνέουσι τὰ ἔχοντα τὸν πνεῦμονα ἔναιμον, ἐκ τούτων δῆλον· τό τε γὰρ θερμότερον πλείονος δεῖται τῆς καταψύξεως, ἅμα δὲ καὶ πρὸς τὴν ἀρχὴν τῆς θερμότητος τῆς ἐν τῇ καρδίᾳ πορεύεται τὸ πνεῦμα
 25 ῥαδίως.

XVI. Ὅν δὲ τρόπον ἡ καρδία τὴν σύντρησιν ἔχει πρὸς τὸν πλεύμονα, δεῖ θεωρεῖν ἐκ τε τῶν ἀνατεμνομένων καὶ τῶν ιστοριῶν τῶν περὶ τὰ ζῶα γεγραμμένων. καταψύξεως μὲν οὖν ὅλως ἡ τῶν ζώων
 30 δεῖται φύσις διὰ τὴν ἐν τῇ καρδίᾳ τῆς ψυχῆς ἐμπύρωσιν. ταύτην δὲ ποιεῖται διὰ τῆς ἀναπνοῆς, ὅσα μὴ μόνον ἔχουσι καρδίαν ἀλλὰ καὶ πνεύμονα τῶν ζώων. τὰ δὲ καρδίαν μὲν ἔχοντα, πνεύμονα δὲ μὴ, καθάπερ οἱ ἰχθύες διὰ τὸ ἔνυδρον αὐτῶν τὴν φύσιν εἶναι, τῷ ὕδατι ποιοῦνται τὴν κατάψυξιν διὰ τῶν
 35 βραγχίων. ὥς δ' ἡ θέσις ἔχει τῆς καρδίας πρὸς
 478 b τὰ βράγχια, πρὸς μὲν τὴν ὄψιν ἐκ τῶν ἀνατομῶν δεῖ θεωρεῖν, πρὸς δ' ἀκρίβειαν ἐκ τῶν ιστοριῶν· ὥς δ' ἐν κεφαλαίοις εἰπεῖν καὶ νῦν, ἔχει τόνδε τὸν τρόπον. δοξείε μὲν γὰρ ἂν οὐχ ὡσαύτως ἔχειν τὴν θέσιν ἡ καρδία τοῖς τε πεζοῖς τῶν ζώων καὶ
 5 τοῖς ἰχθύσιν, ἔχει δ' ὡσαύτως. ἥ γὰρ νεύουσι τὰς κεφαλὰς, ἐνταῦθ' ἡ καρδία τὸ ὄξύ ἔχει. ἐπεὶ δὲ οὐχ ὡσαύτως αἱ κεφαλαὶ νεύουσι τοῖς τε πεζοῖς τῶν ζώων καὶ τοῖς ἰχθύσι, πρὸς τὸ στόμα ἡ καρδία τὸ ὄξύ ἔχει. τείνει δ' ἐξ ἄκρου τῆς καρδίας αὐλὸς

ON RESPIRATION, xv.—xvi.

the soul is small, and the cooling air must pass through-out because of the quantity of blood and heat. But the air can easily fulfil both these functions ; for, because its nature is so rarefied, it can pass through the whole system rapidly and cool it. But water is just the opposite. From this it is obvious why animals which have blood in the lung breathe most ; for the warmer creature requires more cooling, and at the same time the air passes easily to the source of heat, which lies in the heart.

xvi. The way in which the heart is connected with the lung can be seen by dissection, and by my discussion of the subject in the *History of Animals*.^a Speaking generally, the nature of animals requires cooling owing to the fiery nature of the soul which exists in the heart. It achieves this cooling by breathing in the case of animals which have a lung as well as a heart. But those which have a heart but no lung, such as the fishes, because their natural habitat is in water, achieve this cooling by water through the gills. The position of the heart relative to the gills can be seen with the naked eye by dissection, and can be understood with accuracy from my *History* ^b; but to summarize the matter at the moment, this is the method. One might suppose that the position of the heart is different in land animals and in fishes, but actually it is exactly similar. For the apex of the heart points in the direction in which they turn their heads. But since the heads of land animals and fishes do not turn in the same direction, the heart has its apex directed towards the mouth. Now from the extremity of the heart a tube

Connexion
between
heart and
lung.

^a *Hist. An.* 496 a etc., 511 b etc.

^b *Hist. An.* 507 b 3.

478 b

φλεβονευρώδης εἰς τὸ μέσον, ἣ συνάπτουσιν ἀλλή-
 10 λοις πάντα τὰ βράγχια. μέγιστος μὲν οὖν οὗτός
 ἐστίν, ἔνθεν δὲ καὶ ἔνθεν τῆς καρδίας καὶ ἕτεροι
 τείνουσιν εἰς ἄκρον ἐκάστου τῶν βραγχιῶν, δι' ὧν
 ἡ κατάψυξις γίνεται πρὸς τὴν καρδίαν, διαυλωνί-
 ζοντος αἰ τοῦ ὕδατος διὰ τῶν βραγχιῶν. ὡσαύτως
 δὲ τοῖς ἀναπνεύουσιν ὁ θώραξ ἄνω καὶ κάτω κινεῖται
 15 πολλάκις δεχομένων τὸ πνεῦμα καὶ ἐξιέντων, ὥς
 τὰ βράγχια τοῖς ἰχθύσιν, καὶ τὰ μὲν ἀναπνέοντα ἐν
 ὀλίγῳ ἀέρι καὶ τῷ αὐτῷ ἀποπνίγονται· ταχέως γὰρ
 ἐκάτερον αὐτῶν γίνεται θερμόν· θερμαίνει γὰρ ἡ
 τοῦ αἵματος θίξις ἐκάτερον. θερμόν δ' ὃν τὸ αἷμα
 κωλύει τὴν κατάψυξιν· καὶ μὴ δυναμένων κινεῖν
 20 τῶν μὲν ἀναπνεόντων τὸν πνεύμονα τῶν δ' ἐνύδρων
 τὰ βράγχια διὰ πάθος ἢ διὰ γήρας, τότε συμβαίνειν
 τὴν τελευτήν.

XVII. Ἔστι μὲν οὖν πᾶσι τοῖς ζώοις κοινὸν
 γένεσις καὶ θάνατος, οἱ δὲ τρόποι διαφέρουσι τῷ
 εἶδει· οὐ γὰρ ἀδιάφορος ἡ φθορά, ἀλλ' ἔχει τι κοι-
 25 νόν. θάνατος δ' ἐστὶν ὁ μὲν βίαιος ὁ δὲ κατὰ
 φύσιν, βίαιος μὲν ὅταν ἡ ἀρχὴ ἔξωθεν ᾖ, κατὰ
 φύσιν δ' ὅταν ἐν αὐτῷ. καὶ ἡ τοῦ μορίου σύστασις
 ἐξ ἀρχῆς τοιαύτη, ἀλλὰ μὴ ἐπίκτητόν τι πάθος.
 τοῖς μὲν οὖν φυτοῖς αὖανσις, ἐν δὲ τοῖς ζώοις
 καλεῖται τοῦτο γήρας. ἔστι δὲ θάνατος καὶ ἡ
 30 φθορὰ πᾶσιν ὁμοίως τοῖς μὴ ἀτελέσιν· τούτοις δὲ
 παρομοίως μὲν, ἄλλον δὲ τρόπον. ἀτελεῖ δὲ λέγω
 οἶον τὰ τε ὧὰ καὶ τὰ σπέρματα τῶν φυτῶν, ὅσα
 ἄρριζα. πᾶσι μὲν οὖν ἡ φθορὰ γίνεται διὰ θερμοῦ
 τινὸς ἔκλειψιν, τοῖς δὲ τελείοις, ἐν ᾧ τῆς οὐσίας

ON RESPIRATION, XVI.—XVII.

consisting of veins and nerves runs to a point at the centre, at which all the gills connect. This tube is very large, and from different parts of the heart other tubes run to the extremity of each of the gills, through which the cooling process reaches the heart, the water passing through a narrow channel through the gills. In the same way in the breathing animals the chest moves up and down, as they admit and expel the breath, acting in the same way as the gills in fishes. So the breathing animals are suffocated if the air is small in quantity and remains the same ; for in either case it quickly becomes hot ; for in both cases the contact with the blood heats it. The blood being hot checks the cooling ; supposing that the breathing animals cannot move the lung, or the water animals the gills, owing to disease or old age, then death supervenes.

XVII. Birth and death are common characteristics of all living creatures, but the manner in which they occur differs with the species ; for their destruction does exhibit differences, although all have an element in common. Death may be either violent or natural, violent when its origin is external, natural when it originates in the creature itself. In the latter case the structure of the animal involved this end from the beginning, and it was no extraneous disease. This phenomenon is called withering in plants, and in animals old age. Death and destruction is the common fate of all animals alike which are not imperfect ; the latter have a similar end but in another way. By imperfect I mean, for instance, eggs and the seeds of plants, those at least which have no roots. In all cases destruction occurs owing to a failure of heat, but in the perfect animal the failure lies in that

Natural and
unnatural
death.

ARISTOTLE

478 b

ἡ ἀρχή. αὕτη δ' ἐστίν, ὥσπερ εἴρηται πρότερον,
 35 ἐν ᾧ τό τε ἄνω καὶ τὸ κάτω συνάπτει, τοῖς μὲν
 φυτοῖς μέσου βλαστοῦ καὶ ῥίζης, τῶν δὲ ζώων τοῖς
 479 a μὲν ἐναίμοις ἡ καρδία, τοῖς δ' ἀναίμοις τὸ ἀνά-
 λογον. τούτων δ' ἓν ἐν δυνάμει πολλὰς ἀρχὰς
 ἔχουσιν, οὐ μέντοι γε ἐνεργεῖα. διὸ καὶ τῶν ἐν-
 τόμων ἓν ἐν δυνάμει ζῶσι, καὶ τῶν ἐναίμων ὅσα
 5 μὴ ζωτικὰ λίαν εἰσὶ, πολὺν χρόνον ζῶσιν ἐξηρη-
 μένης τῆς καρδίας, οἷον αἱ χελῶναι καὶ κινοῦνται
 τοῖς ποσίν, ἐπόντων τῶν χελωνίων, διὰ τὸ μὴ
 συγκεῖσθαι τὴν φύσιν αὐτῶν εὖ, παραπλησίως δὲ
 τοῖς ἐντόμοις.

Ἡ δ' ἀρχὴ τῆς ζωῆς ἐκλείπει τοῖς ἔχουσιν, ὅταν
 μὴ καταψύχῃται τὸ θερμὸν τὸ κοινωνοῦν αὐτῆς.
 10 καθάπερ γὰρ εἴρηται πολλάκις, συντήκεται αὐτὸ
 ὑφ' αὐτοῦ. ὅταν οὖν τοῖς μὲν ὁ πλεύμων τοῖς δὲ
 τὰ βράγχια σκληρύνῃται, διὰ χρόνου μῆκος ξηραι-
 νομένων τοῖς μὲν τῶν βραγχίων τοῖς δὲ τοῦ πλεύ-
 μονος, καὶ γινομένων γεγηρῶν, οὐ δύναται ταῦτα τὰ
 μόρια κινεῖν οὐδ' αἶρειν καὶ συνάγειν. τέλος δὲ
 15 γινομένης ἐπιτάφσεως καταμαραίνεται τὸ πῦρ.

Διὸ καὶ μικρῶν παθημάτων ἐπιγινομένων ἐν τῷ
 γῆρα ταχέως τελευτῶσιν· διὰ γὰρ τὸ ὀλίγον εἶναι
 τὸ θερμὸν, ἅτε τοῦ πλείστου διαπεπνευκότος ἐν τῷ
 πλήθει τῆς ζωῆς, ἥτις ἂν ἐπίτασις γένηται τοῦ
 μορίου, ταχέως ἀποσβέννυται· ὥσπερ γὰρ ἀκαριαίας
 20 καὶ μικρᾶς ἐν αὐτῷ φλογὸς ἐνούσης διὰ μικρὰν
 κίνησιν ἀποσβέννυται. διὸ καὶ ἄλυπός ἐστιν ὁ ἐν
 τῷ γῆρα θάνατος· οὐδενὸς γὰρ βιαίου πάθους αὐτοῖς
 συμβαίνοντος τελευτῶσιν, ἀλλ' ἀναίσθητος ἡ τῆς
 ψυχῆς ἀπόλυσις γίνεται παντελῶς. καὶ τῶν νοση-
 μάτων ὅσα ποιοῦσι τὸν πνεύμονα σκληρόν ἢ φύ-

ON RESPIRATION, XVII.

part which is the source of their being. This, as has been said before, lies at the point at which the upper and lower parts meet, in plants between the shoot and the root, and in animals with blood in the heart, and in bloodless animals in whatever corresponds to it. Some of these creatures have potentially many sources, but not actually. This is why some of the insects continue to live when divided, and those animals with blood which have not naturally much hold on life, live for a considerable time, when the heart is removed ; such as tortoises, whose feet move so long as their shells are on, because their nature is of a low order of construction, as is true also of the insects.

The source of life fails its possessors when the heat that belongs to it is not cooled. For, as has been said several times, it is wasted away by itself. When, then, in some animals the lung, and in others the gills, grow hard, the gills in the one case and the lung in the other drying through length of time and becoming earthy, these parts cannot move, nor expand, nor contract. But at last the limit of strain is reached and the fire dies out.

Consequently in old age they die rapidly, even when small ailments attack them ; for because the heat in them is very small, as in their long life most of it has been breathed away, any strain taking place in the part quickly extinguishes it. It is extinguished, just as if the flame within was very feeble and small. For this reason death in old age is painless ; for old men die without the occurrence of any violent disease, and the release of the soul occurs imperceptibly. But the diseases which cause hardening of the lung by

479 a

25 μασιν ἢ περιττώμασιν ἢ θερμότητος νοσηματικῆς ὑπερβολῇ, καθάπερ ἐν τοῖς πυρετοῖς, πυκνὸν τὸ πνεῦμα ποιοῦσι διὰ τὸ μὴ δύνασθαι τὸν πνεῦμονα μακρὰν αἶρειν ἄνω καὶ συνίζειν. τέλος δ', ὅταν μηκέτι δύνωνται κινεῖν, τελευτῶσιν ἀποπνεύσαντες.

XVIII. Γένεσις μὲν οὖν ἐστὶν ἡ πρώτη μέθεξις
 30 ἐν τῷ θερμῷ τῆς θρεπτικῆς ψυχῆς, ζωὴ δ' ἡ μονὴ ταύτης. νεότης δ' ἐστὶν ἡ τοῦ πρώτου καταψυκτικοῦ μορίου αὔξησης, γήρας δ' ἡ τούτου φθίσις, ἀκμὴ δὲ τὸ τούτων μέσον. τελευτὴ δὲ καὶ φθορὰ βίαιος μὲν ἡ τοῦ θερμοῦ σβέσις καὶ μάρανσις·
 479 b φθαρείη γὰρ ἂν δι' ἀμφοτέρας ταύτας τὰς αἰτίας, ἡ δὲ κατὰ φύσιν τοῦ αὐτοῦ τούτου μάρανσις διὰ χρόνου μῆκος γινομένη καὶ τελειότητα. τοῖς μὲν οὖν φυτοῖς αὖανσις, ἐν δὲ τοῖς ζώοις καλεῖται θάνατος. τούτου δ' ὁ μὲν ἐν γήρᾳ θάνατος μάρανσις τοῦ μορίου δι' ἀδυναμίαν τοῦ καταψύχειν ὑπὸ
 5 γήρως. τί μὲν οὖν ἐστὶ γένεσις καὶ ζωὴ καὶ θάνατος, καὶ διὰ τίνας αἰτίας ὑπάρχουσι τοῖς ζώοις, εἴρηται.

XIX. Δῆλον δ' ἐκ τούτων καὶ διὰ τίν' αἰτίαν τοῖς μὲν ἀναπνέουσι τῶν ζώων ἀποπνίγεσθαι
 10 συμβαίνει ἐν τῷ ὑγρῷ, τοῖς δ' ἰχθύσιν ἐν τῷ ἀέρι. τοῖς μὲν γὰρ διὰ τοῦ ὕδατος ἡ κατάψυξις γίνεται, τοῖς δὲ διὰ τοῦ ἀέρος, ὧν ἑκάτερα στερίσκεται μεταβάλλοντα τοὺς τόπους. ἡ δ' αἰτία τῆς κινήσεως τοῖς μὲν τῶν βραγχίων τοῖς δὲ τοῦ πνεύμονος, ὧν αἰρομένων καὶ συνιζόντων τὰ μὲν ἐκπνέουσι
 15 καὶ εἰσπνέουσι τὰ δὲ δέχονται τὸ ὑγρὸν καὶ ἐξιᾶσιν, ἔτι δ' ἡ σύστασις τοῦ ὀργάνου, τὸνδ' ἔχει τὸν τρόπον.

XX. Τρία ἐστὶ τὰ συμβαίνοντα περὶ τῆς καρ-

ON RESPIRATION, xvii.—xx.

tumours, or waste products, or by excess of heat due to disease as for instance in fevers, cause rapid breathing, because the lung cannot expand or contract far. But at last when they can no longer move the lung, they breathe their last and die.

XVIII. Birth is the first sharing in warmth of the nutritive soul, and life is merely the perpetuation of this. Youth is the growth of the first cooled part, and old age is its destruction, the prime of life being between the two. But violent destruction and death is the extinction or waning of the heat ; for destruction may occur from either of these causes, but natural death is the decay of the same part due to lapse of time, and to its having reached its appointed end. This phenomenon is called withering among plants, and death among animals. Death in old age is the withering of this part owing to its inability to grow cool because of old age. So we have now defined birth, and life and death, and explained why they occur among living creatures.

XIX. From these facts it is clear why those animals which breathe are suffocated in water, and fishes in air ; for the latter achieve cooling through the water, but the former through air, and when they change their habitat each is deprived of one or other. The reason for the movement in the one case of the gills, and in the other of the lung, by the expansion and contraction of which the former class exhale and inhale and the latter admit and expel water, and also the whole structure of the organ is to be explained as follows.

XX. There are three movements which take place

The meaning of birth.
Fish.
Action of the heart.

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δίαν, ἃ δοκεῖ τὴν αὐτὴν φύσιν ἔχειν, ἔχει δ' οὐ τὴν αὐτὴν, πῆδησις καὶ σφυγμός καὶ ἀναπνοή.

- 20 Πῆδησις μὲν οὖν ἐστὶ σύνωσις τοῦ θερμοῦ τοῦ ἐν αὐτῇ διὰ κατὰ φύσιν περιττωματικὴν ἢ συντηκτικὴν, οἷον ἐν τῇ νόσῳ τῇ καλουμένῃ παλμῶ, καὶ ἐν ἄλλαις δὲ νόσοις, καὶ ἐν τοῖς φόβοις δέ· καὶ γὰρ οἱ φοβούμενοι καταψύχονται τὰ ἄνω, τὸ δὲ θερμὸν ὑποφεύγον καὶ συστελλόμενον ποιεῖ τὴν πῆδησιν,
 25 εἰς μικρὸν συνωθούμενον οὕτως ὥστ' ἐνίοτ' ἀποσβέννυσθαι τὰ ζῶα καὶ ἀποθνήσκειν διὰ φόβον καὶ διὰ πάθος νοσηματικόν.

- Ἡ δὲ συμβαίνουσα σφύξις τῆς καρδίας, ἣν αἰε φαίνεται ποιουμένη συνεχῶς, ὁμοία φύμασιν ἐστίν, ἣν ποιοῦνται κίνησιν μετ' ἀλγηδόνης διὰ τὸ παρὰ
 30 φύσιν εἶναι τῷ αἵματι τὴν μεταβολήν. γίνεται δὲ μέχρι οὗ ἂν πυθθῇ πεφθέν. ἔστι δ' ὁμοιον ζέσει τοῦτο τὸ πάθος· ἡ γὰρ ζέσις γίνεται πνευματομένου τοῦ ὑγροῦ ὑπὸ τοῦ θερμοῦ· αἶρεται γὰρ διὰ τὸ πλείω γίνεσθαι τὸν ὄγκον. παῦλα δ' ἐν μὲν τοῖς
 480 α φύμασιν, ἐὰν μὴ διαπνεύσῃ, παχυτέρου γινομένου τοῦ ὑγροῦ, σῆψις, τῇ δὲ ζέσει ἢ ἔκπτωσις διὰ τῶν ὀριζόντων. ἐν δὲ τῇ καρδίᾳ ἡ τοῦ αἰε προσιόντος ἐκ τῆς τροφῆς ὑγροῦ διὰ τῆς θερμότητος ὀγκωσις ποιεῖ σφυγμόν, αἰρομένη πρὸς τὸν ἔσχατον χιτῶνα
 5 τῆς καρδίας. καὶ τοῦτ' αἰε γίνεται συνεχῶς· ἐπιρρεῖ γὰρ αἰε τὸ ὑγρὸν συνεχῶς, ἐξ οὗ γίνεται ἡ τοῦ αἵματος φύσις· πρῶτον γὰρ ἐν τῇ καρδίᾳ δημιουργεῖται. δῆλον δ' ἐν τῇ γενέσει ἐξ ἀρχῆς· οὕτω γὰρ διωρισμένων τῶν φλεβῶν φαίνεται ἔχουσα αἷμα. καὶ διὰ τοῦτο σφύζει μᾶλλον τοῖς
 10 νεωτέροις τῶν πρεσβυτέρων· γίνεται γὰρ ἡ ἀνα-

ON RESPIRATION, xx.

in the region of the heart, which seem to be of the same character, but really are not: palpitation, pulsation and breathing.

Palpitation is the forcing together of the heat in the heart due to the cooling produced by waste products and decay, as occurs in the disease called heart palpitation among others, and also in fear; for those who are afraid grow cold in their upper parts, and the heat retreating and rallying again produces palpitation, being forced into so small a space, so that sometimes animals suffer extinction and die through fear or through disease.

The beating of the heart which occurs, and which it seems to show continuously, is like the throbbing of an abscess, but the latter is accompanied by pain, because there is an unnatural change in the blood, and this pain continues until the pus produced is discharged. This latter affection is like boiling; for boiling takes place when liquid is aerated by heat: it rises because the swelling becomes greater. In the case of abscesses, if there is no escape, relief comes in the form of suppuration, when the liquid grows thicker, but in boiling it results in overflowing its container. But in the heart swelling of the liquid which continually comes to it through heat causes pulsation, as it rises to the outermost part of the heart wall. This is a continually repeated process; for the liquid is continually flowing in, from which the nature of the blood results; for in the heart it is first manufactured. This is clear in birth from its beginning; for the heart can be seen to contain blood before the veins are differentiated. For this reason there is more rapid pulsation in the young than in the old; for more evaporation takes place in younger

480 a

θυμιάσις πλείων τοῖς νεωτέροις. καὶ σφύζουσιν αἱ φλέβες πᾶσαι, καὶ ἅμα ἀλλήλαις, διὰ τὸ ἡρτῆσθαι ἐκ τῆς καρδίας. κινεῖ δ' αἰεὶ ὥστε κακεῖναι αἰεὶ, καὶ ἅμα ἀλλήλαις, ὅτε κινεῖ. ἀναπήδησις μὲν οὖν ἐστὶν ἡ γινομένη ἄντως πρὸς τὴν τοῦ ψυχροῦ
 15 σύνωσιν, σφύξις δ' ἡ τοῦ ὑγροῦ θερμαινομένου πνευμάτωσις.

XXI. Ἡ δ' ἀναπνοὴ γίνεται αὐξανόμενον τοῦ θερμοῦ, ἐν ᾧ ἡ ἀρχὴ ἡ θρεπτική. καθάπερ γὰρ καὶ τᾶλλα δεῖται τροφῆς, κακεῖνο, καὶ τῶν ἄλλων μᾶλλον· καὶ γὰρ τοῖς ἄλλοις ἐκεῖνο τῆς τροφῆς αἷτιόν ἐστιν.
 20 ἀνάγκη δὴ πλέον γινόμενον αἶρειν τὸ ὄργανον. δεῖ δ' ὑπολαβεῖν τὴν σύστασιν τοῦ ὀργάνου παραπλησίαν μὲν εἶναι ταῖς φύσιν ταῖς ἐν τοῖς χαλκείοις· οὐ πόρρω γὰρ οὗθ' ὁ πνεύμων οὗθ' ἡ καρδιά πρὸς τὸ δέξασθαι σχῆμα τοιοῦτον· διπλοῦν δ' εἶναι τὸ τοιοῦτον· δεῖ γὰρ ἐν τῷ μέσῳ τὸ θρεπτικὸν εἶναι
 25 τῆς φυσικῆς δυνάμεως. αἶρεται μὲν οὖν πλεῖον γενόμενον, αἰρομένου δ' ἀναγκαῖον αἶρεσθαι καὶ τὸ περιέχον αὐτὸ μόριον. ὅπερ φαίνονται ποιεῖν οἱ ἀναπνέοντες· αἶρουσι γὰρ τὸν θώρακα διὰ τὸ τὴν ἀρχὴν τὴν ἐνοῦσαν αὐτῷ τοῦ τοιούτου μορίου ταῦτο τοῦτο ποιεῖν· αἰρομένου γάρ, καθάπερ εἰς τὰς
 80 φύσας, ἀναγκαῖον εἰσφέρειν τὸν ἀέρα τὸν θύραθεν,
 480 b καὶ ψυχρὸν ὄντα καὶ καταψύχοντα σβεννύναι τὴν ὑπεροχὴν τὴν τοῦ πυρός. ὥσπερ δ' αὐξανόμενον ἤρετο τοῦτο τὸ μόριον, καὶ φθίνοντος ἀναγκαῖον συνίξειν, καὶ συνίζοντος ἐξιέναι τὸν ἀέρα τὸν εἰσελθόντα πάλιν, εἰσιόντα μὲν ψυχρὸν ἐξιόντα δὲ
 5 θερμὸν διὰ τὴν ἀφῆν τοῦ θερμοῦ τοῦ ἐνόντος ἐν τῷ μορίῳ τούτῳ, καὶ μάλιστα τοῖς τὸν πνεῦμονα ἔναιμον ἔχουσιν· εἰς πολλοὺς γὰρ οἶον ἀνέλωνας τὰς
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ON RESPIRATION, xx.—xxi.

men. All the veins throb, and at the same time as each other, because they are attached to the heart. The heart is always moving ; therefore the veins are also, and they move at the same time as each other, when the heart moves. Palpitation, then, is the reaction which the heart makes to the pressure of the cold, but pulsation is the aeration of the heat in liquid.

XXI. Breathing occurs when the heat increases on which the nutritive soul depends. For just as all the other parts need food, so does it, and even to a greater extent than the other parts ; for it is rather the cause of food in the other parts. As it increases the organ must rise. One may regard the structure of the organ as very like the bellows in a forge ; for neither heart nor lung is very far from adopting this shape. An organ of this kind must be double ; for the nutritive part must be in the middle of its vital force. When it expands it rises, and when it rises that part of the body which envelops it must also rise. This is what men seem to do when they breathe ; for they raise their chest, the source of this part residing therein doing the same thing ; for when the chest rises it must introduce the air from outside into it, as it does into the bellows, and being cold and producing coolness it quenches the excess of fire. Just as when it increases in size this part rises, so it must subside as it grows smaller, and, as it contracts, the air which entered in passes out again ; coming in cold and going out hot, because of its contact with the heat which resides in this part, especially in those whose lung contains blood. For the tubes in the lung fall

The
function of
breathing.

480 b

σύριγγας ἐμπίπτειν τὰς ἐν τῷ πνεύμονι, ὧν παρ' ἐκάστην παρατέτανται φλέβες, ὥστε δοκεῖν ὅλον εἶναι τὸν πνεύμονα πλήρη αἵματος. καλεῖται δ' ἡ
 10 μὲν εἴσοδος τοῦ ἀέρος ἀναπνοή, ἡ δ' ἔξοδος ἐκπνοή. καὶ αἰεὶ δὴ τοῦτο γίνεται συνεχῶς, ἕως περ ἂν ζῇ καὶ κινῇ τοῦτο τὸ μόριον συνεχῶς. καὶ διὰ τοῦτο ἐν τῷ ἀναπνεῖν καὶ ἐκπνεῖν ἐστὶ τὸ ζῆν.

Τὸν αὐτὸν δὲ τρόπον καὶ τοῖς ἰχθύσιν ἡ κίνησις γίνεται τῶν βραγχίων. αἰρομένου μὲν γὰρ τοῦ
 15 θερμοῦ τοῦ ἐν τῷ αἵματι διὰ τῶν μορίων αἰρονται καὶ τὰ βράγχια, καὶ διῶσι τὸ ὕδωρ· κατιόντος δὲ πρὸς τὴν καρδίαν διὰ τῶν πόρων καὶ καταψυχομένου συνίζουσι, καὶ ἀφιάσι τὸ ὕδωρ. αἰεὶ δ' αἰρομένου τοῦ ἐν τῇ καρδίᾳ, αἰεὶ δέχεται πάλιν καταψυχομένου. διὸ κακείνοις τοῦ ζῆν καὶ μὴ ζῆν τὸ τέλος
 20 ἐστὶν ἐν τῷ ἀναπνεῖν, καὶ τούτοις ἐν τῷ δέχεσθαι τὸ ὑγρόν.

Περὶ μὲν οὖν ζωῆς καὶ θανάτου καὶ τῶν συγγενῶν ταύτης τῆς σκέψεως, σχεδὸν εἴρηται περὶ πάντων. περὶ δὲ ὑγιείας καὶ νόσου οὐ μόνον ἐστὶν
 25 ἱατροῦ ἀλλὰ καὶ τοῦ φυσικοῦ μέχρι τοῦ τὰς αἰτίας εἰπεῖν. ἥ δὲ διαφέρουσι καὶ ἥ διαφέροντα θεωροῦσιν, οὐ δεῖ λανθάνειν, ἐπεὶ ὅτι γε σύνορος ἡ πραγματεία μέχρι τινός ἐστι, μαρτυρεῖ τὸ γνωόμενον· τῶν τε γὰρ ἱατρῶν ὅσοι κομψοὶ ἢ περίεργοι, λέγουσιν τι περὶ φύσεως καὶ τὰς ἀρχὰς ἐκείθεν ἀξιοῦσι λαμβάνειν, καὶ τῶν περὶ φύσεως πραγματευθέντων
 30 οἱ χαριέστατοι σχεδὸν τελευτῶσιν εἰς τὰς ἀρχὰς τὰς ἱατρικάς.

ON RESPIRATION, XXI.

into many channels so to speak, along each of which the veins stretch, so that the whole lung seems to be full of blood. The entry of the air is called inhalation, its exit exhalation. And this occurs continuously as long as the creature lives, and continually moves this part. This is why life depends upon inhalation and exhalation.

In the same way movement of the gills takes place among fishes. When the heat in the blood rises through the parts of the body the gills also rise, and the water passes through them ; but when it descends towards the heart through the passages, and as it grows cool, the gills contract and expel the water. As the heat in the heart is continually rising, so as it cools again it always returns. Just, then, as in land animals the achievement of living or not living depends entirely on breathing, so in the water animals it depends on admitting water.

We have nearly finished our entire inquiry into life, death and kindred subjects. As for health and disease it is not merely the business of the physician but also of the physical philosopher to discuss their causes up to a point. But the way in which these two classes of inquirers differ and consider different problems must not escape us, since the facts prove that up to a point the methods go hand in hand ; for those physicians who have subtle and inquiring minds have something to say about natural science, and claim to derive their principles therefrom, and the most polished of those who deal with natural science really conclude with medical principles.

ON BREATH

INTRODUCTION

It is generally admitted that this is not the work of Aristotle. It is in many respects unlike the other treatises in this volume, and it draws a distinction—unknown to Aristotle—between “veins” and “arteries,” though the latter term seems frequently to mean not blood-vessels, but air-passages. The essay belongs to the Peripatetic School, and for this reason has a right to a place among the works of Aristotle.

The obscurity of its meaning is exaggerated by the indifferent condition of the manuscripts, which in some cases are evidently wrong and in some actually defective.

ΠΕΡΙ ΠΝΕΥΜΑΤΟΣ

481 a I. Τίς ἡ τοῦ ἐμφύτου πνεύματος διαμονή, καὶ
 τίς ἡ αὔξησις; ὁρῶμεν γὰρ ὅτι πλέον καὶ ἰσχυρό-
 τερον γίνεται καὶ καθ' ἡλικίας μεταβολὴν καὶ κατὰ
 διαθέσιν σώματος, ἢ ὡς τὰλλα μέρη, προσγινο-
 5 μένου τινός. προσγίνεται δὲ τροφή τοῖς ἐμψύχοις,
 ὥστε ταύτην σκεπτέον ποία τε καὶ πόθεν. δύο δὲ
 τρόποι δι' ὧν γίνεται, ἡ διὰ τῆς ἀναπνοῆς, ἡ διὰ
 τῆς κατὰ τὴν τῆς τροφῆς προσφορὰν πέψεως,
 καθάπερ τοῖς ἄλλοις. τούτων ἴσως οὐχ ἥττον ἀν¹
 δόξειεν διὰ τῆς τροφῆς· σῶμα γὰρ ὑπὸ σώματος
 10 τρέφεται, τὸ δὲ πνεῦμα σῶμα. τίς οὖν ὁ τρόπος;
 ἡ δῆλον ὡς ἐκ τῆς φλεβός ὀλκῇ τινὶ καὶ πέψει.
 τὸ γὰρ αἷμα ἡ ἐσχάτη τροφή καὶ ἡ αὐτὴ πᾶσιν.
 ὥσπερ οὖν καὶ εἰς τὸ ἀγγεῖον αὐτοῦ καὶ εἰς τὸ
 περιεχόμενον λαμβάνει τροφήν εἰς τὸ θερμόν. ἄγει
 15 δ' ὁ ἄῃρ τὴν ἐνέργειαν ποιῶν, τὴν τε πεπτικὴν
 αὐτὸς αὐτῷ προστιθεὶς αὔξει καὶ τρέφει. οὐδὲν
 δ' ἴσως ἄτοπον αὐτό γε τοῦτο, ἀλλὰ γενέσθαι τὸ
 πρῶτον ἐκ τῆς τροφῆς. καθαρώτερον γὰρ ὁ τῇ
 ψυχῇ συμφυές, εἰ μὴ καὶ τὴν ψυχὴν ὕστερον λέγοι
 γίνεσθαι, διακρινομένων τῶν σπερμάτων καὶ εἰς

¹ οὐχ οὕτω B.

ON BREATH

I. What is the meaning of the permanence of the breath implanted in the body, and how does its growth take place? We see that it becomes more and stronger, both according to change of age and the disposition of the body, or as in the other parts of the body by some addition. Living beings with souls have their addition by food, so that we have to consider the nature and source of these additions in the case of breath. There are two ways in which it occurs, either by breathing, or by the process of digestion due to the presentation of food, as in the case of the rest of the body. Of these two one would more naturally suppose it due to food; for a body is fed by a body, and breath is a body. What, then, is its method? Clearly by drawing in and assimilating breath from the veins. For the blood is the ultimate food, and is the same for all. So then it takes food into its warmth, just as into its container and envelope. The air, then, acts by producing activity and, by joining the aid of digestion to itself, produces growth and nourishment. Probably there is nothing strange in this, but it would be more strange to suppose it the result of food in the first instance. For that which naturally belongs to the soul is purer, unless one were to suppose that the soul is born afterwards, by the seeds separating and coming into their

The
function
of breath.

481 a

20 φύσιν ἰόντων. εἴ τε¹ περίττωμα πάσης τροφῆς ἐστί,
 ποία διαπέμπεται τοῦτο; κατὰ μὲν γὰρ τὴν
 ἐκπνοὴν οὐκ εὐλογον· ἀντιλαμβάνει γὰρ εὐθύς.
 λοιπὸν δὲ δῆλον ὅτι διὰ τῶν τῆς ἀρτηρίας πόρων.
 τὸ δ' ἐκκρινόμενον ἥτοι λεπτότερον ἢ παχύτερον.
 ἀμφοτέρως δ' ἄτοπον, εἰ τοῦτο πάντων ἔσται καθα-
 25 ρώτατον. εἰ δὲ παχύτερον, ἔσονται τινες πόροι
 μείζους. εἰ δ' ἄρα κατὰ τοὺς αὐτοὺς λαμβάνει
 καὶ ἐκπέμπει, τοῦτ' αὐτὸ παράλογον καὶ ἄτοπον.
 ἢ μὲν οὖν ἐκ τῆς τροφῆς αὕξησις καὶ διαμονὴ
 σχεδὸν ταῦτα.

II. Ἡ δ' ἐκ τῆς ἀναπνοῆς, ὥσπερ Ἀριστογένους
 οἶεται (τροφήν γὰρ οἶεται καὶ τὸ πνεῦμα πεττό-
 80 μενον, οὐ τοῦ ἀέρος ἐν τῷ πνεύματι· τοῦτο δ' εἰς
 481 b τὰ ἀγγεῖα διαδίδοσθαι, τὸ περίττωμα πάλιν ἐκπέμ-
 πεσθαι) πλείους ἔχει τὰς ἀπορίας. ἢ τε γὰρ πέψις
 ὑπὸ τίνος; εἰκὸς μὲν γὰρ ὑπ' αὐτοῦ, καθάπερ
 καὶ τῶν ἄλλων. αὐτὸ δὲ τοῦτ' ἄτοπον, εἰ μὴ
 διαφέρει τοῦ ἔξω ἀέρος· οὕτω δ' ἡ θερμότης ἂν
 5 πέττοι. καὶ μὴν καὶ παχύτερον αὐτὸν εὐλογον εἶναι
 μεθ' ὑγρότητος τῆς ἀπὸ τῶν ἀγγείων ὄντα καὶ
 τῶν ὄλων ὄγκων, ὥσθ' ἡ πέψις ἂν εἰς τὸ σωμα-
 τῶδες εἴη. τὸ δὲ περίττωμα, εἴπερ γίνεται λεπτό-
 τερον, οὐ πιθανόν. ἄλογος δὲ καὶ ἡ ταχυτῆς τῆς
 πέψεως. εὐθύς γὰρ μετὰ τὴν εἰσπνοὴν ἢ ἐκπνοή.
 10 τί οὖν τὸ οὕτω ταχὺ μεταβάλλον καὶ ἀλλοιοῦν;
 ὑπολάβοι γὰρ ἂν τις μάλιστα τὸ θερμόν, καὶ μαρ-
 τυρεῖ οὕτως ἡ αἰσθησις· ὁ γὰρ ἐκπνεόμενος θερμός.

¹ εἴτε B.

ON BREATH, I.—II.

own nature. If there is a waste product of all food, how can it be expelled in the case of breath? It is not reasonable to suppose that it is by exhalation; for that takes place immediately. There is left the obvious conclusion that it takes place by the channels of the windpipe. For that which is secreted is either lighter or denser. In either case it is absurd that it should be the purest of all. If it is thicker, there will necessarily be larger channels. But if it receives and discharges by the same channels, this is also improbable and strange. So the theory that the growth and continuance of breath arises from food presents these problems.

II. There is a theory that it arises from breathing, as Aristogenes supposes (for he thinks that the breath when digested is a form of food: not, that is, of the air in the breath; this he thinks is absorbed into the receptacles, but the waste product is expelled again); but this theory involves even more difficulties. What is the agency of this digestion? It would be natural to suppose that it is due to the same thing as in other animals. But this seems improbable unless it differs from the outside air; for in this case its heat would digest it. And again it would seem probable that it should become thicker because of the liquid that arises from the containers, and from the general inflation, so that digestion would be into something corporeal. But that the waste product becomes lighter cannot be believed. The swiftness of digestion is unreasonable. For exhalation occurs immediately after inhalation. What then can it be which produces a change of state so rapidly? One might suppose that it was heat, and the senses give evidence of this, for the air breathed out is hot.

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ἔτι δ' εἰ μὲν ἐν τῷ πνεύμονι καὶ τῇ ἀρτηρίᾳ τὸ πεττόμενον, ἢ τοῦ θερμοῦ δύναμις ἐν τούτοις· ὅπερ οὐ φασιν, ἀλλ' ἐν τῇ κινήσει τῇ τοῦ πνεύματος
 15 ἐκθερμαίνεσθαι τὴν τροφήν. εἰ δ' ἐξ ἑτέρου τινὸς οἶον ἐπισπᾶται ἢ καὶ κινούντος δέχεται, τοῦτ' ἐστὶ θαυμασιώτερον. ἅμα δὲ καὶ οὐκ αὐτὸ τὸ πρῶτον κινεῖν.

"Ἐτι δ' ἢ μὲν ἀναπνοὴ μέχρι τοῦ πνεύμονος, ὥσπερ λέγουσιν αὐτοί, τὸ δὲ πνεῦμα δι' ὅλου τὸ
 20 σύμφυτον. εἰ δ' ἀπὸ τούτου διαδίδεται καὶ πρὸς τὰ κάτω καὶ πρὸς τὰ ἄλλα, πῶς ἢ πέψις οὕτω ταχεῖα; θαυμασιώτερον γὰρ τοῦτο καὶ μείζον· οὐ γὰρ διαπέμπει τοῦτό γ' εὐθὺς πεττόμενον τὸν ἀέρα τοῖς κάτω. καίτοι τὸ μὲν δόξειεν ἂν ἀναγκαῖον εἶναι τοῦτο τῆς πέψεως γινομένης ἐν τῷ πνεύμονι,
 25 τῆς τ' ἀναπνοῆς κοινωνούντων καὶ τῶν κάτω.

Μείζον δ' οὕτως ἔτι καὶ παραδοξότερον τὸ συμβαίνειν· οἶον γὰρ διόδω καὶ θίξει γίνεται μόνον ἢ πέψις. ἄλογον δὲ καὶ τουτὶ καὶ λογοδέστερον, εἰ ὁ αὐτὸς πόρος τῆς τροφῆς καὶ τοῦ περιττώματος. εἰ δὲ δι' ἄλλου τινὸς τῶν ἐντός, οἱ αὐτοὶ λόγοι οἱ
 80 καὶ πρότερον, εἰ μὴ τοῦτο λέγοι τις, ὥς οὐ πάσης
 482 a τῆς τροφῆς οὐδὲ πᾶσι γίνεται περίττωμα, καθάπερ οὐδὲ τοῖς φυτοῖς, ἐπεὶ οὐδὲ τῶν τοῦ σώματος μερῶν ἐκάστου λαβεῖν ἔστιν. εἰ δὲ μὴ, οὐτι γε παντός. ἀλλ' ἄρα γε ἢ μὲν ἀγγείων αὔξησις ἢ αὐτὴ καὶ τῶν ἄλλων μορίων, εὐρνομένων δὲ καὶ
 5 διισταμένων τούτων πλείων ὁ ἀῆρ ὁ εἰσρέων καὶ ἐκρέων. εἰ δέ τι ἀναγκαῖον ἐνυπάρχει, τοῦτο αὐτὸ

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Moreover, if that which is digested is in the lung and in the windpipe, the force of heat must lie in them too ; this they deny, saying that the food is warmed in the movement of the breath. But it is still more amazing to suppose that it is, so to speak, absorbed from some outside source and receives it through the agency of some other impulse. But it is certainly not itself the prime cause of the movement.

Moreover the breathing only reaches as far as the lung, as they themselves admit, but the breath which is inherent in the creature goes all through it. If, then, it is received in succession from this to the lower parts and the rest, how is digestion so rapid ? This is more remarkable and a greater problem ; for it does not distribute the air the moment it is digested to the parts below ; and yet this would seem to be essential if digestion takes place in the lung, and the breathing communicates with the parts below.

But in this case what occurs is a greater and more inexplicable mystery ; for in this case digestion seems merely to be like a passage through and a contact. But it is unreasonable, in fact more unreasonable, to suppose that the same account applies both to food and to waste product. But if it takes place through any other of the internal organs, the same arguments apply as before, unless one is prepared to say that the waste product does not occur with all kinds of food, nor with all creatures, as it does not for instance with plants, since one cannot assume it of each of the parts of the body. And if not, certainly not in every case. But then the growth of the receptacles is the same as that of the other parts, and, as they expand and swell, the air flowing in and out becomes more. But if this is necessarily so, the question we are ask-

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ζητεῖται, τίς ὁ φυσικὸς καὶ πῶς οὗτος πλείων
 ὑγιῶς, ἐκ τούτου φανερόν ἂν εἶεν. τοῖς δὲ δὴ μὴ
 ἀναπνευστικοῖς τίς ἡ τροφή τοῦ συμφύτου καὶ τίς
 ἡ αὔξησης; οὐ γὰρ ἔτι τούτοις ἀπὸ τοῦ ἔξωθεν.
 10 εἰ δ' ἀπὸ τῶν ἐντὸς καὶ τῆς κοινῆς τροφῆς, εὐλογον
 κάκεῖνοις· ἀπὸ γὰρ τῶν αὐτῶν τὰ ὅμοια, καὶ
 ὡσαύτως. εἰ μὴ ἄρα καὶ τούτοις ἀπὸ τοῦ ἐκτός,
 ὥσπερ καὶ τῶν ὁσμῶν αἰσθάνονται. ἀλλ' οὕτω γ'
 οἷον ἀναπνοὴ γίνεται. περὶ οὗ καὶ ἀπορήσειέ τις,
 εἰ κατὰ ἀλήθειάν ἐστιν, αὐτό τε τοῦτο προφέρων
 15 καὶ τὴν ἐπίσπασιν τῆς τροφῆς (ὅλκῃ γὰρ αἷμα
 πνεύματος), ἔτι δ' ὑπὲρ τῆς καταψύξεως ἀντι-
 λέγων, ὥς κάκεῖνων δεομένων. εἰ δὲ διὰ τοῦ
 ὑποζώματος αὐτοῖς γίνεται, ταύτῃ δῆλον ὅτι καὶ
 ἡ τοῦ αἵρος εἴσοδος· ὥσθ' ὁμοίον τι τῇ ἀναπνοῇ.
 πλὴν οὐκ ἀφορίζεται τίς ὅλκῃ καὶ ὑπὸ τίνος. ἡ
 20 εἰ μὴ ὅλκῃ, πῶς ἡ εἴσοδος; εἰ μὴ ἄρα αὐτομάτως.
 τοῦτο μὲν οὖν ἔχει καὶ αὐτὸ καθ' αὐτὸ σκέψιν.

Τοῖς δὲ δὴ ἐνύγροις τίς ἡ τροφή καὶ αὔξησης τοῦ
 συμφύτου; χωρὶς γὰρ τοῦ μὴ ἀναπνεῖν οὐδ'
 ἐνυπάρχειν ὅλως ἐν τῷ ὑγρῷ φαμέν αἆρα. λοιπὸν
 25 ἄρα διὰ τῆς τροφῆς, ὥς οὐχ ὁμοίως πᾶσιν, ἡ
 κάκεῖνα διὰ τῆς τροφῆς τὰ ἐνυγρὰ· τριῶν γὰρ
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ing—what is the natural breath and how does it healthily increase in size—would be answered from our previous statement. But in those creatures which do not breathe, what is the food of their natural breath, and what is its growth? In their case it certainly could not come from the outside. But if it comes from the parts inside, and from the general store of food, it is reasonable that the same should be true in the case of the others; for similar results come from the same causes and in the same way. Unless, of course, it is possible that in their case too food comes from the outside, and that they apprehend it like scents. But this is really a sort of breathing. One might have considerable doubt as to whether this is true, instancing both the fact itself and the drawing in of the food (for a drawing in of the breath occurs at the same time), and also arguing against it because of the cooling, on the assumption that they, like other creatures, need it. If, then, this takes place through the diaphragm, clearly the entry of the air must also be by this way; so that in a sense it would be like breathing. But this does not define what this drawing in is, nor by what agency it takes place. If there is no drawing in, how is there any entry? Unless it is an automatic action. This however requires an inquiry all by itself.

But in the case of water animals what is the food, and the growth of their natural breath? For apart from the fact that they do not breathe, we do not suppose that, generally speaking, there is any air in water. So the only remaining supposition is that it comes through food, in which case, either the process is not the same as in all other creatures, or else the water animals also receive it through food; for one

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τούτων ἀναγκαῖον ἔν. καὶ ταῦτα μὲν ὥς περὶ τὴν αὔξησιν καὶ τροφήν τοῦ πνεύματος.

III. Περὶ δὲ ἀναπνοῆς οἱ μὲν οὐ λέγουσι τίνος χάριν, ἀλλὰ μόνον ὃν τρόπον γίνεται, καθάπερ
 80 Ἐμπεδοκλῆς καὶ Δημόκριτος· οἱ δ' οὐδὲ τὸν τρόπον ὅλως λέγουσιν, ἀλλ' ὥς φανερῶ χρῶνται. δεῖ δὲ καὶ εἰ καταψύξεως χάριν, αὐτὸ τοῦτο διασαφῆσαι. εἰ γὰρ ἐν τοῖς ἄνω τὸ θερμόν, οὐκ ἂν ἔτι δέοιτο κάτω. τὸ δὲ σύμφυτον πνεῦμα δι' ὅλου, καὶ ἀρχὴ ἀπὸ τοῦ πνεύμονος. δοκεῖ δὲ καὶ τὸ τῆς ἀναπνοῆς
 85 εἰς πάντα διαδίδοσθαι κατὰ συνέχειαν, ὥστε τοῦτο δεικτέον ὥς οὐκ ἔστιν. ἄτοπον δὲ εἰ μὴ δεῖται
 482 b τινος κινήσεως καὶ οἶον τροφῆς. εἰ δὲ διαπνεῖ πρὸς πᾶν, οὐκέτι καταψύξεως εἴη χάριν. ἀλλὰ μὴν καὶ ἡ διάδοσις ἄλλως τ' ἀναίσθητος, καὶ τὸ τάχος αὐτῆς. καὶ πάλιν τὸ τῆς παλιρροίας, εἴπερ ἀπὸ πάντων, θαυμαστόν, πλὴν εἰ ἄλλον τρόπον
 5 ἀπὸ τῶν ἐσχάτων. τὸ δὲ πρῶτως καὶ κυρίως ἀπὸ τῶν περὶ τὴν καρδίαν. ἐν πολλοῖς δ' οὕτω τὸ τῶν ἐνεργειῶν καὶ τῶν δυνάμεων. ἄτοπον οὖν ὁμῶς εἰ καὶ εἰς τὸ ὅστούν διαδίδονται· καὶ γὰρ δὴ τοῦτό φασιν ἐξ ἀρτηριῶν. διό, καθάπερ εἴρηται, σκεπτέον περὶ ἀναπνοῆς, καὶ τίνος ἕνεκα καὶ ποίοις
 10 μέρεσι καὶ πῶς. ἔτι οὐδ' ἐπιφορὰ τῆς τροφῆς φαίνεται πᾶσι δι' ἀρτηριῶν, οἶον αὐτοῖς τε τοῖς ἀγγείοις καὶ ἄλλοις τισὶ τῶν μερῶν· ζῆ δὲ τὰ φυτὰ καὶ τρέφεται. ταῦτα μὲν οἰκειότερά πως τοῖς περὶ τὰς τροφάς.

IV. Ἐπεὶ δὲ τρεῖς αἱ κινήσεις τοῦ ἐν τῇ ἀρτηρίᾳ

ON BREATH, II.—IV.

of these three things must be true. So much, then, for the growth and increase of the breath.

III. On the question of breathing some authors, such as Empedocles and Democritus, do not say why it takes place, but only the method by which it occurs; others again do not even deal completely with the method, but treat it as obvious. Now if its purpose is to produce cooling, one must make this point quite clear. For if the heat belongs to the upper parts, cooling would not be needed below. But the breath implanted within goes through the whole, and its source is the lung. But the action of breathing seems to be transmitted continually into every part, so we should have to prove that this is untrue. It is a strange thing, then, if the lower parts do not need some movement and food as it were. If, then, breath passes everywhere, there would be no need for cooling. But the transmission is in other ways imperceptible and so is its speed. Again, its reflux, if it comes from all parts, is astonishing, unless it takes place from the extremities in some other way. But its first and foremost reflux originates from the region of the heart. But in many creatures the process of energies and functions behaves in this way. All the same it is remarkable if it is transmitted to the bone; for they say that this takes place from the air passages. So, as has been said, we must consider breathing, what it is for, in what parts it occurs, and how. Nor does the addition of food come to all organs through the air passages, for instance to the vessels themselves, and other parts of the body; for plants live and are nourished. Perhaps these questions are more relevant to a discussion of food.

IV. But since there are three distinct movements Breath must have a definite function.

How does breath act?

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15 πνεύματος, ἀναπνοή, σφυγμός, τρίτη δ' ἡ τὴν τροφήν ἐπάγουσα καὶ κατεργαζομένη, λεκτέον ὑπὲρ ἐκάστης καὶ ποῦ καὶ πῶς καὶ τίνος χάριν. τούτων δ' ἡ μὲν τοῦ σφυγμοῦ καὶ τῇ αἰσθήσει φανερά καθ' ὅτι οὖν μέρος ἀπτομένοις, ἡ δὲ τῆς ἀναπνοῆς μέχρι μὲν τοῦ φανερά, τὸ δὲ πλεόν κατὰ λόγον, 20 ἡ δὲ τῆς τροφῆς ἅπαντα κατὰ λόγον ὡς εἰπεῖν, ὡς ἐκ τῶν συμβαινόντων δὲ κατὰ τὴν αἴσθησιν. ἡ μὲν οὖν ἀναπνοή δῆλον ὡς ἀπὸ τοῦ ἐντὸς ἔχει τὴν ἀρχήν, εἴτε ψυχῆς δύναμιν εἴτε ψυχὴν δεῖ λέγειν ταύτην, εἴτε καὶ ἄλλην τινὰ σωματίων μίξιν, ἡ δι' 25 αὐτῶν ποιεῖ τὴν τοιαύτην ὀλκὴν. ἡ δὲ θρεπτικὴ δόξειεν ἂν ἀπὸ τῆς ἀναπνοῆς· αὕτη γὰρ ἀνταποδίδοται, καὶ ὁμοία τῷ ἀληθεῖ. εἰ δὲ μή, πᾶν ὁμαλίζει τοῖς χρόνοις τὸ σῶμα κατὰ τὴν τοιαύτην κίνησιν. ἢ εἰ μηδὲν διαφέρει τὸ ἅμα, πάντα τὰ μέρη σκεπτέον. ὁ δὲ σφυγμός ἴδιός τις παρ' 30 αὐτάς, τῇ μὲν ἂν δοκῶν εἶναι κατὰ συμβεβηκός, εἶπερ, ὅταν ἐν ὑγρῷ πλῆθος ἢ θερμότητος, ἀνάγκη τὸ ἐκπνευματούμενον διὰ τὴν ἐναπόληψιν ποιεῖν σφυγμόν, ἐν τῇ ἀρχῇ δὲ καὶ πρῶτον, εἶπερ τοῖς πρῶτοις σύμφυτον· ἐν γὰρ τῇ καρδίᾳ μάλιστα καὶ πρῶτον, ἀφ' ἧς καὶ τοῖς ἄλλοις, τάχα δὲ πρὸς τὴν 35 ὑποκειμένην οὐσίαν τοῦ ζώου τὴν ἐκ τῆς ἐνεργείας ἀνάγκη τοῦτο παρακολουθεῖν.

483 a "Ὅτι δ' οὐδὲν πρὸς τὴν ἀναπνοὴν ὁ σφυγμός, σημεῖον· εἴαν τε γὰρ πυκνὸν εἴαν τε ὁμαλὸν εἴαν τε σφοδρὸν ἢ πρᾶον ἀναπνέη τις, ὁ γε σφυγμός ὁμοιος καὶ ὁ αὐτός, ἀλλ' ἡ ἀνωμαλία γίνεται καὶ

ON BREATH, IV.

of the breath in the windpipe, breathing, pulsation and the third which introduces and acts upon food, we must explain in each case where, how and why it takes place. Of these the movement of pulsation is perceptible to those who touch any part ; that of respiration is perceptible up to a point, but most of it is a question of theory, while the whole of the movement as it affects food is so to speak theoretical, but, in so far as it can be determined from its results, it is a matter of perception. It is clear that breathing has its source from within, whether we are right to describe it as a function of the soul, or the soul itself, or some other mixture of bodies, which produces such a drawing by means of bodies. But the nutritive soul would seem to arise from breathing ; for breathing corresponds to this, and is like it in truth. If this is not so, every body is equated with time by such a movement. If its simultaneous occurrence makes no difference, then all parts must be examined. The pulsation is a special feature beyond these, seeming on the one hand to be only incidental, since, when there is a quantity of heat in the liquid, that which is breathed out must cause pulsation by its interruption, but on the other it is to be regarded as an original source and primary, since it exists by nature in primary organs ; for first and foremost it is in the heart, from which it is communicated to the other organs. But it must necessarily follow from the underlying essence of the animal, which arises from its activity.

But there is evidence that pulsation has no connexion with breathing ; for whether a man breathes rapidly or steadily, heavily or quietly, the beating of the heart remains the same and unaltered, but

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ἐπίτασις ἐν τε σωματικοῖς τισὶ πάθεσι καὶ ἐν τοῖς
 5 τῆς ψυχῆς φόβοις ἐλπίσιν ἀγωνίαις.

Εἰ δὲ καὶ ἐν ταῖς ἀρτηρίαις ὁ σφυγμός, καὶ ὁ
 αὐτὸς ὢν ρύθμῳ καὶ ὁμαλὸς ᾗ, σκεπτέον· οὐκ ἔοικε
 δέ γε τοῖς μακρὰν ἀπηρτημένοις. ἥκιστα δ' ἕνεκά
 του φαίνεται γίνεσθαι, καθάπερ εἴρηται. τὸ γὰρ
 αὐτῆς ἀναπνοῆς καὶ τῆς ἐπαγωγῆς, εἴθ' ὥς ἕτερα
 10 πᾶμπαν ἀλλήλων εἴθ' ὥς θάτερον πρὸς, θάτερον,
 ἕνεκά του φαίνεται καὶ ἔχει τινὰ λόγον. τριῶν
 δ' οὐσῶν πρότερον¹ εὐλογον εἶναι τὴν γε σφυγμώδη
 καὶ τὴν ἀναπνευστικὴν; ἡ γὰρ τροφή προϋπάρ-
 χοντος. ἡ οὐ; τὸ μὲν γὰρ ἀναπνεῖν, ὅταν ἀπολυθῇ
 τῆς κυούσης, ἡ δ' ἐπιφορὰ καὶ ἡ τροφή καὶ ξυν-
 15 ισταμένου καὶ ξυνεστηκότος, ὁ δὲ σφυγμός εὐθὺς
 ἐν τῇ ἀρχῇ ξυνισταμένης τῆς καρδίας, καθάπερ ἐν
 τοῖς ῥοοῖς γίνεται φανερόν. ὥστε αὕτη πρώτη,
 καὶ ἔοικεν ἐνεργεῖα τινὶ καὶ οὐκ ἐναπολήψει πνεύ-
 ματος, εἰ μὴ ἄρα τοῦτο πρὸς τὴν ἐνέργειαν.

V. Τὸ δὲ πνεῦμα τὸ ἐκ τῆς ἀναπνοῆς φέρεσθαι
 20 μὲν εἰς τὴν κοιλίαν, οὐ διὰ τοῦ στομάχου (τοῦτο
 μὲν γὰρ ἀδύνατον), ἀλλὰ πόρον εἶναι παρὰ τὴν
 ὁσφύν, δι' οὗ τὸ πνεῦμα τῇ ἀναπνοῇ φέρεσθαι ἐκ
 τοῦ βραγχίου εἰς τὴν κοιλίαν καὶ πάλιν ἔξω· τοῦτο
 δὲ τῇ αἰσθήσει φανερόν.

Ἐχει δ' ἀπορίαν καὶ τὰ περὶ τὴν αἴσθησιν. εἰ
 25 γὰρ ἡ ἀρτηρία μόνον αἰσθάνεται, πότερα τῷ πνεύ-
 ματι τῷ δι' αὐτῆς, ἢ τῷ ὄγκῳ, ἢ τῷ σώματι;
 ἢ εἴπερ ὁ ἀῆρ πρῶτον ὑπὸ τὴν ψυχὴν, τῷ κυριω-

¹ πρότερον B.

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unevenness and strain appear during some bodily ailments and in conditions of fear, expectation and conflict in the soul.

We must next consider whether the pulsation occurring in the arteries maintains a steady and an even rhythm ; it does not seem so in those which are far apart. But, as has been said, this does not seem to exist for any purpose. The action of breathing and drawing in of food, whether each of them exists entirely for each other, or one for one purpose and one for another, seems to have an object and a rational explanation. But of the three functions it is reasonable to suppose that pulsation and breathing are prior. For food of course assumes something previous. Or is this wrong? For breathing starts as soon as the embryo is released from its mother, but the growth and feeding belong to it while it is being constructed, and after it has been constructed, but pulsation begins at the very moment that the heart is formed, as can be observed in eggs. So that pulsation is prior in origin, and seems to be an activity, and not due to an interruption of the breath, except in so far as this contributes to its activity.

V. The drawing of the breath into the stomach in breathing does not take place through the throat (this would be impossible), but there is a passage along the loin, through which the breath is carried by breathing from the windpipe into the stomach and out again ; this is evidenced by the senses.

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But these facts communicated by the senses present difficulties. For, if the windpipe merely feels, is it because of the breath passing through it, or by its swelling or by its bodily nature? If the air is the first factor in life after the soul, is it by means of the

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τέρω τε καὶ προτέρω; τί οὖν ἡ ψυχὴ; δυνάμιν
 φασι τὴν αἰτίαν τῆς κινήσεως τῆς τοιαύτης. ἡ
 δὴλον ὥς οὐκ ὀρθῶς ἐπιτιμήσεις τοῖς τὸ λογιστικὸν
 80 καὶ θυμικόν· καὶ γὰρ οὗτοι ὥς δυνάμεις λέγουσιν.
 ἀλλ' εἰ δὴ ἡ ψυχὴ ἐν τῷ ἀέρι τούτῳ, οὗτός γε
 κοινός. ἡ πάσχων γέ τι καὶ ἀλλοιούμενος εὐλόγως
 ἂν ἔμψυχον ἢ ψυχὴ, πρὸς τὸ συγγενὲς φέρεται, καὶ
 τῷ ὁμοίῳ τὸ ὅμοιον αὖξεται. ἡ οὐ; τὸ γὰρ ὅλον
 οὐκ ἀήρ, ἀλλὰ συμβαλλόμενόν τι πρὸς ταύτην τὴν
 85 δυνάμιν ὁ ἀήρ, ἡ οὐ τὸ ταύτην ποιοῦν, καὶ τὸ
 ποιῆσαν τοῦτ' ἀρχὴ καὶ ὑπόθεσις.

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Τοῖς δὲ μὴ ἀναπνέουσιν, ἵνα ἀνεπίμικτος τῷ
 ἔξω. ἡ οὐ, ἀλλὰ κατ' ἄλλον τρόπον μιγνύμενος;
 τίς οὖν ἡ διαφορὰ τοῦ ἐν τῇ ἀρτηρίᾳ πρὸς τὸν
 ἔξω; διαφέρειν γὰρ εὐλογον, τάχα δὲ καὶ ἀναγ-
 5 καῖον, λεπτότητι· ἀλλ' ἔτι δὲ καθ' αὐτὸν θερμός
 ἢ ὑφ' ἑτέρου; φαίνεται γὰρ ὁ ἔσω καθάπερ ὁ
 ἔξω· βοηθεῖται δὲ τῇ καταψύξει. πότερα δέ; ἔξω
 μὲν γὰρ πρᾶϋς, ἐμπεριληφθεὶς δὲ πνεῦμα, καθάπερ
 πυκνωθεὶς καὶ διαδοθεὶς πως. ἡ μίξιν τινὰ ἀνάγκη
 λαμβάνειν, ἐν ὑγρότητί τε καὶ σωματικοῖς ὄγκοις
 10 ἀναστρεφόμενον; οὐκ ἄρα λεπτότατος, εἴπερ μέ-
 μικται. καὶ μὴν εὐλογόν γε τὸ πρῶτον δεκτικὸν
 ψυχῆς, εἰ μὴ ἄρα καὶ ἡ ψυχὴ τοιοῦτον, καὶ οὐ
 καθαρὸν τι καὶ ἀμιγές. τὴν δ' ἀρτηρίαν μόνον
 εἶναι δεκτικὴν πνεύματος, τὸ δὲ νεῦρον οὐ. δια-
 15 φέρει δὲ καὶ ὅτι τὸ μὲν νεῦρον ἔχει τάσιν, ἡ δ'
 ἀρτηρία ταχὺ διαρρήγνυται, καθάπερ καὶ ἡ φλέψ.

ON BREATH, v.

controlling and prior part? What then is the soul? They say that the reason of movement of this kind is its function. But it is clear that one is not right to censure those who call it the seat of reasoning and the passions; for these speak of them as functions. But if the soul resides in the air, this is common. But if by some affection or change it becomes alive this soul would naturally be attracted to what is related to it, and like will increase by like. Or is this not so? For, it may be said, the air is not the whole of the soul, but the air contributes something to its function, or else what creates or has created this is its origin and basis.

But what about those creatures which do not breathe, where there is no mixture with the air outside? Or is this not so, but is it mixed in some other way? What then is the difference between the air in the air passage and the air outside? It is natural and perhaps inevitable that it should differ in lightness. But again, is it hot in itself, or only heated by something else? For the air inside seems to be like the air outside; but it is assisted by cooling. But which of the two is true? Outside the air is mild, but when enclosed it is breath, and is in a sense thickened and dissipated. Must it then receive some mixing, by moving about in liquid and by bodily swelling? It is not, then, very fine, if it is mixed. Now it is natural that the first receptacle of the soul should be fine (unless the soul itself is of this character, and is not pure and unmixed), and that the air passage should be the first receptacle of the breath and the nerve not. It makes a difference that the nerve can stand tension, but that the air passage is quickly broken through, just like a vein. But the skin is

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τὸ δὲ δέρμα ἐκ φλεβὸς καὶ νεύρου καὶ ἀρτηρίας, ἐκ φλεβὸς μὲν ὅτι κεντηθὲν αἷμα ἀναδίδωσιν, ἐκ νεύρου δὲ ὅτι τάσιν ἔχει, ἐξ ἀρτηρίας δὲ ὅτι διαπνοὴν ἔχει. μόνον γὰρ δεκτικὸν πνεύματος ἡ ἀρτηρία. τὰς δὲ φλέβας ἔχειν πόρους, ἐν αἷς τὸ θερμὸν ὃν
 20 ὥσπερ ἐν χαλκείῳ θερμαίνειν τὸ αἷμα· φύσει γὰρ οὐκ εἶναι θερμὸν, ἀλλ' ὥσπερ τὰ τηκτὰ καταδια-
 χεῖσθαι· διὸ καὶ πήγνυσθαι τὴν ἀρτηρίαν, καὶ ἔχειν ὑγρότητα καὶ ἐν αὐτῇ καὶ ἐν τοῖς χιτῶσι τοῖς περιέχουσιν τὸ κοίλωμα. φανερόν δ' ἔκ τε τῶν
 25 ἀνατομῶν εἶναι, καὶ ὅτι εἰς τὸ ἔντερον καὶ εἰς τὴν κοιλίαν αἱ τε φλέβες καὶ αἱ ἀρτηρίαι συνάπτουσιν, ὥς εἰκὸς εἶναι τὴν τροφήν ἔλκειν. ἐκ δὲ τῶν φλεβῶν εἰς τὰς σάρκας διαδίδοσθαι τὴν τροφήν, οὐ κατὰ τὰ πλάγια ἀλλὰ κατὰ τὸ στόμα, καθάπερ σωλῆνας. ἀποτείνειν γὰρ ἐκ τῶν πλαγίων φλεβῶν
 30 φλέβια λεπτὰ ἐκ τῆς μεγάλης φλεβὸς καὶ τῆς ἀρτηρίας παρ' ἐκάστην πλευράν, καὶ ἀρτηρίαν καὶ φλέβα παρακείσθαι· καὶ τὰ ὀστέα δὲ καθάπτειν τὰ νεῦρα καὶ τὰς φλέβας καὶ εἰς μέσα καὶ εἰς τὰς συμβολὰς τῶν κεφαλῶν, δι' ὧν τὴν τροφήν δέχεσθαι τοὺς ἰχθύας καὶ ἀναπνεῖν· εἰ δὲ μὴ ἀνέπνεον,
 35 ἐξαιρεθέντας ἂν ἐκ τοῦ ὑγροῦ εὐθὺς θνήσκειν.

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Τὰς δὲ φλέβας καὶ τὰς ἀρτηρίας συνάπτειν εἰς ἀλλήλας καὶ τῇ αἰσθήσει φανερόν εἶναι. τοῦτο δ' οὐκ ἂν συμβαίνειν, εἰ μὴ ἐδεῖτο καὶ τὸ ὑγρὸν πνεύματος καὶ τὸ πνεῦμα ὑγροῦ, τῷ θερμὸν εἶναι ἐν νεύρῳ καὶ ἀρτηρίᾳ καὶ φλεβί, θερμότατον δὲ
 4 καὶ οἶον φλεβωδέστατον τὸ ἐν τῷ νεύρῳ.

Ἄτοπον οὖν τῇ τοῦ πνεύματος χώρα τὸ θερμὸν, ἄλλως τε καὶ καταψύξεως χάριν. εἰ δὲ ποιεῖ καὶ οἶον ἀναζωπυρεῖ θερμῷ τὸ θερμὸν, γίγνεται ἂν.

ON BREATH, v.

made from veins, nerves and air passages ; from veins because it emits blood when pricked, from nerves because it admits tension, and from air passages because it allows the passage of air. For the air passage alone is receptive of air. But the veins have passages, in which the heat, as though it were in a brazen vessel, warms the blood ; for it is not naturally hot, but the heat passes into it, just as soluble substances do ; this is why the air passage is hard, and contains moisture within it, and in the coverings which surround the cavity. It becomes obvious from dissection that both the veins and the air passages are connected with the internal organs and with the stomach, and that they naturally draw the food. But the food passes through from the veins to the flesh, not through the sides but through the mouth as through channels. For from the veins stretching sideways small light veins extend from the great vein and air passage along each side, and air passage and vein lie side by side. Both nerves and veins are attached to bones, both in the middle parts and in the junctions of the head, through which fishes admit food and breathe : if they did not breathe, when taken out of the water they would die at once.

But the veins and air passages are attached to each other, as can be discovered by feeling them. This would not be the case unless the liquid needed breath and the breath liquid, because there is heat in the nerve, in the air passage and in the vein, but the hottest and, so to speak, the most venous, is that in the nerve.

Heat is not suitable to the place of the breath, especially in view of the necessary cooling. But if it is a fact that heat is generated, and in a sense resurrected by heat, then it might happen in this way.

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ἔτι πάντων τῶν ἔχόντων θερμότητα σύμφυτόν πως
 ἢ διαμονή, μηδενὸς ἀντικειμένου μηδὲ καταψύχον-
 10 τος. ὅτι γὰρ πάντα δεῖται καταψύξεως, σχεδὸν
 φανερόν τῳ αἷμα κατέχειν ἐν τῇ φλεβί τὸ θερμόν
 οἶον ἀποστέγον· διὸ καὶ ὅταν ἐκρυῇ, μεθιέναι τε
 καὶ ἀποθνήσκειν, τῳ τὸ ἥπαρ οὐκ ἔχειν οὐδεμίαν
 ἀρτηρίαν.

VI. Πότερον δὲ τὸ σπέρμα διὰ τῆς ἀρτηρίας ὡς
 15 καὶ συνθλιβόμενον, καὶ ἐν τῇ προέσει μόνον; ἐν
 οἷς δὴ φαίνεται καὶ ἡ ἐξ αἵματος μεταβολὴ τῳ τὰ
 νεῦρα ἀπὸ τῶν ὁστῶν τρέφεσθαι· καθάπτει γὰρ
 αὐτά. ἢ οὔτε τοῦτ' ἀληθές· καὶ γὰρ ἐν τῇ καρδίᾳ
 νεῦρον, καὶ νεῦρα δὲ ἐκ τῶν ὁστῶν ἡρτημένα. οὐ
 20 συνάπτει δὲ ἐν ἑτέρῳ, ἀλλ' εἰς σάρκα ἀποτελευντᾷ.
 ἢ τοῦτό γ' οὐθέν· εἴη γὰρ ἂν οὐθέν ἦττον ἀπὸ τοῦ
 ὁστοῦ ἢ τροφῇ. αὐτοῖς δ' ἀπὸ τοῦ νεύρου τοῖς
 ὁστοῖς μᾶλλον τὴν τροφήν. ἄτοπον γὰρ καὶ τοῦτο.
 ξηρόν γὰρ φύσει καὶ οὐκ ἔχον πόρους ὑγρούς· ἢ
 τροφή δ' ὑγρόν. σκεπτέον δὲ πρότερον, εἴπερ
 ἀπὸ τῶν ὁστῶν, τίς ἢ τοῦ ὁστοῦ τροφή, ἢ φέρουσι
 25 πόροι καὶ ἐκ τῆς φλεβὸς καὶ ἐκ τῆς ἀρτηρίας εἰς
 αὐτόν. καὶ ἐν πολλοῖς μὲν εὐδηλοι, μάλιστα δ'
 εἰς τὴν ράχιν. τὰς δ' ἀπὸ τῶν ὁστῶν γίνεσθαι
 συνεχεῖς, ὥσπερ ταῖς πλευραῖς· τούτους δ' ἀπὸ
 τῆς κοιλίας τίνα τρόπον, ἢ πῶς τῆς ὀλκῆς γινόμε-
 νης; ἢ τὰ πολλὰ ἄχονδρα, καθάπερ ἡ ράχιν· ἀλλ'
 30 οὔτι πρὸς τὴν κίνησιν, ἢ συνάψεως χάριν. δεῖ δέ,
 καὶ εἰ ἀπὸ τοῦ νεύρου τὸ ὁστοῦν τρέφεται, τὴν
 τοῦ νεύρου τροφήν εἰδέναι. ἡμεῖς δὲ φαμεν ἐκ τῆς

ON BREATH, v.—vi.

Again, the persistence of all things containing heat is in a sense a natural quality, provided that nothing opposes nor causes a cooling. That everything needs cooling is almost obvious from the fact that the blood retains the heat in the veins as if it occluded it. So when it flows out, the heat escapes and the animal dies, because the liver has no air passage.

VI. Does the semen pass through the air passage Nerves. by pressure, or does this only take place in emission? In such cases also the change from blood (into flesh) is evidently due to the nerves being nourished from the bones; for they knit them together. Possibly this is not true; for there is a nerve in the heart as well as nerves attached to the bones. But the heart nerve does not unite anything, but ends in flesh. Possibly this is of no account; for none the less the nourishment of the nerve would come from the bone. And yet the bones might more easily be supposed to derive their nourishment from the nerves. But this is curious, for the bone is naturally dry, and has no passages for liquid. But food is wet. We must consider first what the nourishment supplied by the bone is, if it comes from the bones; and whether the passages both from vein and air passage carry it to the bone itself. In many places these passages are visible, especially those leading to the spine. But those leading from the bones are often continuous as they are in the ribs; but how could they come from the stomach, and how would the food be drawn in? For most of them have no cartilage, like the spine; and are not therefore suited to movement, or for knitting together. But if the bone is fed from the nerve, one must inquire what feeds the nerve. We

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ὕγρότητος γλίσχρας οὔσης τῆς περὶ τὸ αὐτό.
 πόθεν δ' αὐτὴ καὶ πῶς, λεκτέον. τὸ ἐκ φλεβὸς
 καὶ ἀρτηρίας τὴν σάρκα, ὅτι πανταχόθεν αἷμα τῇ
 35 κεντήσει, ψεῦδος ἐπὶ γε τῶν ἄλλων ζώων, οἷον
 ὀρνίθων καὶ ὄφειων καὶ ἰχθύων ἢ ὅλως τῶν ὠροτόκων·
 ἀλλὰ τῶν πολυαίμωνων τοῦτ' ἴδιον, ἐπεὶ τῶν ὀρνιθίων
 γε καὶ τεμνομένων τὸ στῆθος ἰχώρ, οὐχ αἷμα. Ἐμ-
 484 b πεδοκλήης δὲ ἐκ νεύρου τὸν ὄνυχά τῇ πῆξει. ἄρ'
 οὖν οὕτω καὶ δέρμα πρὸς σάρκα; ἀλλὰ τοῖς ὀστρα-
 κοδέρμοις καὶ μαλακοστράκοις πῶς ἀπὸ τῶν ἐκτὸς
 ἢ τροφή; τούναντίον γὰρ δοκεῖ μᾶλλον ἀπὸ τῶν
 ἐντὸς ἢ τῶν ἐκτὸς. ἔτι δὲ ποία καὶ διὰ τίνων ἢ
 5 ἐκ τῆς κοιλίας δίοδος; καὶ πάλιν ἢ ἐκείνων ἀνα-
 στροφή πρὸς τὴν σάρκα, καίπερ ἄλογος οὔσα.
 πολὺ γάρ τι θαυμαστὸν φαίνεται καὶ ἀδύνατον
 ὅλως. ἄρα γε ἄλλοις ἄλλη τροφή, καὶ οὐ πᾶσι
 τροφή τὸ αἷμα· πλὴν ἐκ τούτου τᾶλλα.

VII. Τὴν τῶν ὀστέων φύσιν ἄρα σκεπτέον ἢ πρὸς
 10 κίνησιν ἢ πρὸς ἔρεισμα, καὶ πρὸς τὸ στέγειν καὶ
 περιέχειν, ἔτι δ' εἰ ὥσπερ ἀρχαὶ ἔνια, καθάπερ ὁ
 πόλος. λέγω δὲ πρὸς μὲν κίνησιν, οἷον ποδὸς ἢ
 χειρὸς ἢ σκέλους ἢ ἀγκῶνος, ὁμοίως τὴν τε καμ-
 πτικήν καὶ τὴν κατὰ τόπον· οὐδὲ γὰρ τὴν τοπικὴν
 οἶόν τε ἄνευ κάμψεως. σχεδὸν δὲ καὶ τὰ ἐρείσ-
 15 ματα ἐν τούτοις. τὴν δὲ τοῦ στέγειν καὶ περιέχειν,
 οἷον τὰ ἐν τῇ κεφαλῇ τὸν ἐγκέφαλον, καὶ ὅσοι δὴ
 τὸν μυελὸν ἄρχειν. αἱ δὲ πλευραὶ τοῦ συγκλείειν.

ourselves say it is from the liquid surrounding it which is glutinous. Then it must be explained whence this arises and how. The idea that flesh is made from vein and air passage, because blood issues from every point at which it is pricked, is false in the case of the other animals such as birds, snakes, and fishes and generally of the oviparous animals. It is really peculiar to the full-blooded animals, since, when the breast of the small birds is cut, it is not blood but ichor that flows out. Empedocles thinks that nail is formed from nerve by a process of hardening. Is the relation between skin and flesh the same ? But how is it possible for either the hard or soft-shelled creatures to get their food from the outside ? They seem on the other hand to derive it rather from inside than from outside. Again, of what nature and by what means is the passage from the stomach ? And again its return as flesh, unreasonable though it is ? The whole thing is mysterious, and generally speaking inexplicable. Perhaps other animals have another source of food, and it is not blood in all cases ; and yet the others are really formed from blood.

VII. Now we have to consider the nature of the bones, whether they are designed for movement or for support, and also as covering and envelope, and whether some are the origin of movement, like the axis of the universe. By "for movement" I mean the movement of the foot, or hand, or leg, or elbow, equally for bending and for movement from place to place ; for this latter movement is impossible without bending. Support seems to depend in man upon the bones mentioned. As covering and envelope, I mean as the skull covers the brain, like those who regard the marrow as the controlling agent. The ribs are

The
function of
the bones.

484 b

ἀρχὴ δὲ καὶ μένον ἢ ῥάχῃς, ἀφ' ἧς καὶ αἱ πτέρυραι
πρὸς τὴν σύγκλεισιν. ἀνάγκη γὰρ εἶναι τι τοιοῦ-
τον ἅπαν γὰρ τὸ κινούμενον ἐξ ἡρεμοῦντος.

20 Ἄμα δὲ καὶ δεῖ γε εἶναι τὸ οὐ ἕνεκα. ἐν ᾧ
δὴ καὶ τὴν ἀρχὴν ἐνιοι, τὸν τε ῥαχίτην καὶ τὸν
ἐγκέφαλον. ἔτι δὲ παρὰ ταῦτ' ἐπὶ συναφῆς καὶ
συγκλείσεως χάριν, οἷον ἢ κλείς· ὅθεν ἴσως καὶ
τοῦνομα. πρὸς δὲ τὴν χρεῖαν ἕκαστον καλῶς.
οὔτε γὰρ ἢ κάμψις, οὔτε τοῦ ὅλου οὔτε τῶν μερῶν,

25 εἰ μὴ τοιαῦτα, οἷον ῥάχῃς, πούς, ἀγκῶν. εἴσω
γὰρ δεῖ τὴν κάμψιν πρὸς τὴν χρεῖαν. ὁμοίως δὲ
καὶ τὴν τοῦ ποδὸς καὶ τῶν ἄλλων τοιαύτην.
ἅπαντα δὲ ἕνεκά του, καὶ τὰ ἐν τούτοις ὅσῃ,
οἷον ἢ ἐν τῷ ἀγκῶνι κερκὶς ἕνεκα τῆς στροφῆς
τοῦ ἀγκῶνος καὶ τῆς χειρός. οὐ γὰρ ἐδυνάμεθα

30 πρηνῇ καὶ ὑπτίαν κινεῖν ἄνευ ταύτης, οὐδὲ τοὺς
πόδας ἐπαίρειν καὶ κάμπτειν, εἰ μὴ δύο αἱ ἐν τῇ
κινήσει κερκίδες. ὡσαύτως δὲ καὶ τὰ ἄλλα σκε-
πτέον, οἷον ἢ τοῦ τραχήλου κίνησις, εἰ ἐν τὸ ὅσ-
τουν. δεῖ δὲ καὶ ὅσα πρὸς κατάληψιν ἢ σύνδεσμον,
οἷον ἢ μύλη ἢ ἐπὶ τῷ γόνατι. ἀλλὰ καὶ διὰ τί τοῖς

35 ἄλλοις οὐ. ὅσα μὲν οὖν κινητικά, πάντα μὲν μετὰ
νεύρων, ἴσως δ' ὅσα πρακτικῶς μάλιστα, οἷον τὰ
περὶ ἀγκῶνα καὶ σκέλη καὶ χεῖρας καὶ πόδας. τὰ
δ' ἄλλα συνδέσμου χάριν, ὅσα δεῖται. ἐνίοις γὰρ
ἴσως οὐδὲν ἢ ἐπ' ὀλίγον, οἷον ἢ ῥάχῃς, ἀλλ' ἢ¹

485 a κάμψις. καὶ γὰρ ἢ πρὸς ἄλληλα κόλλησις ἰχώρ

¹ ἢ B.

^a i.e. radius in the arm and tibia in the leg.

ON BREATH, VII.

intended to enclose. The origin and fixed part of the system is the spine, from which the ribs radiate to enclose. They must be of this character ; for all movement depends on something stationary.

At the same time there must be a purpose for which they exist. Some class as this both the spinal marrow and the brain. Besides these there are bones at the junctions for the purpose of interlocking, such as the collar-bone ; perhaps its name (the key-bone) is derived from this. Each of these is admirably suited to its object. If it were not for such bones as the spine, the foot and the elbow, there could be no bending either of the whole or of parts. The bending of the elbow must take place inwards to achieve its purpose ; and the same thing applies to the foot and the other limbs. All things exist for a purpose, as do the bones in these parts ; for instance the radius in the forearm for the purpose of bending the elbow and the hand. For without it we could not move either forward or upward, nor raise and bend the feet, if there were not two radii ^a employed in the movement. In the same way we must consider other things, such as the movement of the neck, whether there is one bone only concerned. We have also to consider what belongs to seizing or knitting together, like the patella over the knee ; and why no other bones have such an arrangement. All the bones concerned in movement work with sinews, and most of all those which are connected with action, such as those about the elbow, legs, hands and feet. All the others, which are needed, are for the sake of knitting together. Some have little or no function, except for bending ; such as the spine. For what connects the bones to each other is ichor

ἐστι καὶ ὑγρότης μυξώδης. τὰ δὲ καὶ συνδέεται νεύροις, οἷον τὰ περὶ τὰ ἄρθρα.

VIII. Πάντων δ' ἐστὶ λόγος ὁ βελτίων ὥς καὶ
 5 νῦν ζητεῖν· ἀλλὰ τὰς ἀρχὰς ἐφ' ἱκανόν, ὣν χάριν, σκεπτέον. οὐκ ἂν δόξειε κινήσεως ἕνεκα τὰ ὅσῃ, ἀλλὰ μᾶλλον τὰ νεῦρα ἢ τὰ ἀνάλογον, ἐν ᾧ πρῶτῳ τὸ πνεῦμα τὸ κινήτικόν, ἐπεὶ καὶ ἡ κοιλία κινεῖται καὶ ἡ καρδιά νεῦρα ἔχει· τὰ δ' οὐ πᾶσιν, ἀλλ'
 10 ἐνίοις, ἀνάγκη καὶ πρὸς τὴν τοιαύτην κίνησιν νεῦρα ἔχειν, ἢ εἰς τὸ ὁ γὰρ πολύπους ἐπ' ὀλίγον καὶ κακῶς βαδίζει. δεῖ γὰρ τοῦτο λαβεῖν ὥσπερ ἀρχήν, ὅτι πᾶσιν, ἢ ἄλλου τινὸς χάριν· ἀλλὰ πρὸς τὴν κίνησιν τὴν οἰκείαν, οἷον τοῖς μὲν πεζοῖς πόδας, καὶ τοῦτο τοῖς μὲν ὀρθοῖς δύο, τοῖς δὲ παντελῶς
 15 ἐπὶ τῆς γῆς πλείους, ὅσοις ἡ ὕλη γεωδεδεστέρα, καὶ ψυχροτέρα. (τὰ δὲ καὶ ἄποδα ὅλως ἐγχωρεῖ· βία γὰρ οὕτω κινεῖσθαι.) τοῖς δὲ πτηνοῖς πτέρυγας, καὶ τούτων τὴν μορφήν οἰκείαν τῇ φύσει. διάφορα δὲ τοῖς πτητικωτέροις καὶ βραδυτέροις. πόδας δὲ τροφῆς χάριν καὶ ἀναστάσεως, πλὴν τῆς νυκτερίδος·
 20 διὸ καὶ τὴν τροφήν ἐκ τοῦ ἀέρος. καὶ μὴ δεῖσθαι διαναπαύσεως· οὐ δέονται γὰρ δι' ἄλλων. τὰ δὲ ὀστρακόδερμα τῶν ἐνύδρων ὑπόποδα διὰ τὸ βάρος. καὶ ταῦτα μὲν πρὸς τὴν κατὰ τόπον ἀλλαγὴν· ὅσα δὲ πρὸς τὴν ἄλλην χρεῖαν, ὥσπερ ὑψηγείται καὶ ἐκάστου τὰ ἴδια, καὶ εἴ τι μὴ προφανές, οἷον διὰ

^a Five or six letters are missing in all mss.

ON BREATH, VII.—VIII.

and mucous fluid. The rest are bound together by sinews, such as those about the joints.

VIII. An investigation like this is the best for ^{Bones} discovering all things, but we must consider as far as ^{(continued).} is desirable what they are for. Bones would not seem to exist for the sake of movement, but rather the sinews, or what corresponds to them, in which the organ of movement essentially resides, since both the stomach moves and the heart has sinews; this is not true in all cases but in some; they must then have sinews with a view to movement of this kind or for^a. For the cuttlefish walks very little, and that little indifferently. We must assume as a starting-point that all have these organs for different purposes, each being adapted to its own special form of movement; for instance, feet for animals that move on land, and of these two for those which stand erect, more for those which are flat on the ground, whose material essence is more earthy and colder. (It is thus possible for some creatures to be entirely footless: and such can only be moved by force.) For the winged creatures thus have wings, and each has a shape appropriate to its nature. There is a difference between those whose flight is faster or slower. They have feet for the purpose of getting food and for standing upright; except for the bat; because the bat gets its food from the air. Such creatures do not need to alight for rest; and they need not do so for any other reason. The hard-shelled water creatures have feet to support their weight. And they use them for transport from place to place; all that serve any other need, are as the special qualities of each dictate. This is true even if the reason is not obvious, for instance why many-

485 a

25 τί τὰ πολύποδα βραδύτατα, καίτοι τὰ τετράποδα θάττω τῶν διπόδων· πότερον ὅτι ἐπὶ γῆς ὅλα τὰ σώματα; ἢ ὅτι φύσει ψυχρὰ καὶ δυσκίνητα; ἢ δι' ἄλλην αἰτίαν;

IX. Οἱ ἀναιροῦντες ὥς οὐ τὸ θερμὸν τὸ ἐργαζόμενον ἐν τοῖς σώμασιν, ἢ ὅτι μία τις φορά καὶ δύναμις ἢ τμητική τοῦ πυρός, οὐ καλῶς λέγουσιν. οὐδὲ γὰρ ὅλα τοῖς ἀψύχοις ταῦτο ποιεῖ πᾶσιν, ἀλλὰ τὰ μὲν πυκνοῖ, τὰ δὲ μανοῖ καὶ τήκει, τὰ δὲ πηγνύσιν. ἐν δὲ δὴ τοῖς ἐμψύχοις οὕτως ὑποληπτέον, ὥσπερ φύσεως πῦρ ζητοῦντα, καθάπερ τέχνης· καὶ γὰρ ἐν ταῖς τέχναις ἕτερον τὸ χρυσοχοϊκὸν καὶ τὸ χαλκευτικὸν καὶ τὸ τεκτονικὸν πῦρ ἀποτελεῖ, καὶ τὸ μαγειρικόν. ἴσως δ' ἀληθέστερον ὅτι αἱ 30 τέχναι· 485 b χρῶνται γὰρ ὥσπερ ὀργάνῳ μαλάττουσαι καὶ τήκουσαι καὶ ξηραίνουσαι, ἔνια δὲ καὶ ῥυθμίζουσαι.

Τὸ αὐτὸ δὴ τούτο καὶ αἱ φύσεις· ὅθεν δὴ καὶ πρὸς ἄλληλα διαφοραί. διὸ γελοῖον πρὸς τὸ ἕξω κρίνειν· 5 εἴτε γὰρ διακρῖνον εἴτε λεπτύνον εἴθ' ὅτιδήποτ' ἐστὶ τὸ θερμαίνεσθαι καὶ πυροῦσθαι, διαφορὰν ἕξει τὰ ἔργα τοῖς χρωμένοις. ἀλλ' αἱ μὲν τέχναι ὥς ὀργάνῳ χρῶνται, ἢ δὲ φύσις ἅμα καὶ ὥς ὕλη.

Οὐ δὴ τοῦτο χαλεπόν, ἀλλὰ μᾶλλον τὸ τὴν φύσιν αὐτὴν νοῆσαι τὴν χρωμένην, ἥτις ἅμα τοῖς αἰσθη- 10 τοῖς πάθεσι καὶ τὸν ῥυθμὸν ἀποδώσει. τοῦτο γὰρ οὐκέτι πυρὸς οὐδὲ πνεύματος. τούτοις δὴ καταμεμίχθαι τοιαύτην δύναμιν θαυμαστόν. ἔτι δὲ

1 δὲ B.

footed creatures are the slowest movers, and yet quadrupeds move faster than bipeds. Is it because the whole body is on the ground (*i.e.* in the case of the many-footed creatures)? Or because the others are naturally cold and hard to move? Or again is it for some other reason?

IX. Those who maintain that heat is not the operative principle in bodies, or that the destructive function of fire is its one and only movement and power, are inaccurate. For it does not produce exactly the same effect in all soulless things, but some it thickens and some it thins and melts, others again it hardens. So in the case of all creatures possessing soul we must assume that the results are the same, seeking the effects of fire in nature, just as we should of fire in a craft; for in the crafts, the art of the goldsmith and of the carpenter, fire produces different results; so it does in cooking. Perhaps more accurately the crafts produce the different results; for they use the fire as an instrument for softening, melting or drying, and in some cases for tempering.

In nature things achieve the same results; whence the differences they exhibit. To judge, then, from the outside is absurd; for whether we consider heating and firing as a separating, lightening or anything else, the results will vary according to the user. But the crafts use fire as an instrument, but nature uses it in this way and as material.

This presents no difficulty, but rather the difficulty lies in the fact that nature, the user, herself thinks, seeing that she will assign the balance to perceived effects. This is not due either to fire or breath. And it is remarkable that such a function should be mingled with these. But moreover the same re-

Heat in
the body.

485 b

τοῦτο θαυμαστὸν ταῦτόν καὶ περὶ ψυχῆς· ἐν τούτοις
 γὰρ ὑπάρχει. διόπερ οὐ κακῶς εἰς ταῦτόν, ἢ
 ἀπλῶς ἢ μῑρίον τι τὸ δημιουργοῦν, καὶ τὸ τὴν
 κίνησιν ἀεὶ τὴν ὁμοίαν ὑπάρχειν ἐνέργειαν· καὶ γὰρ
 15 ἡ φύσις, ἀφ' ἧς καὶ ἡ γένεσις. ἀλλὰ δὴ τίς ἡ
 διαφορὰ τοῦ καθ' ἕκαστον θερμοῦ; εἴθ' ὥς ὄργανον
 εἴθ' ὥς ὕλην εἴθ' ὥς ἄμφω. πυρὸς γὰρ διαφοραὶ
 κατὰ τὸ μᾶλλον καὶ ἥττον. τοῦτο δὲ σχεδὸν
 ὥσπερ ἐν μίξει καὶ ἀμιξίᾳ· τὸ γὰρ καθαρώτερον
 μᾶλλον. ὁ αὐτὸς δὲ λόγος καὶ ἐπὶ τῶν ἄλλων
 20 ἀπλῶν. ἀνάγκη γάρ, ἐπείπερ ἕτερον ὅσπου καὶ
 σὰρξ ἡ ἵππου καὶ ἡ βοός, ἡ τῷ ἐξ ἐτέρων εἶναι ἢ
 τῇ χρήσει διαφέρειν. εἰ μὲν οὖν ἕτερα, τίνες αἱ
 διαφοραὶ ἐκάστου τῶν ἀπλῶν; καὶ τίς; ταύτας
 γὰρ ζητοῦμεν. εἰ δὲ ταῦτά, τοῖς λόγοις ἂν δια-
 φέροι. ἀνάγκη γὰρ δυοῖν θάτερον, καθάπερ ἐν τοῖς
 25 ἄλλοις· οἴνου μὲν γὰρ καὶ μέλιτος κρᾶσις¹ διὰ τὸ
 ὑποκείμενον, οἴνου δ' αὐτοῦ, εἴπερ ἕτερα, διὰ τὸν
 λόγον. διὸ καὶ Ἐμπεδοκλῆς μίαν² ἀπλῶς τὴν τοῦ
 ὅσπου φύσιν, εἴπερ ἅπαντα τὸν αὐτὸν λόγον ἔχει
 τῆς μίξεως, ἀδιάφορα ἐχρῆν ἵππου καὶ λέοντος καὶ
 ἀνθρώπου εἶναι. νῦν δὲ διαφέρει σκληρότητι, μα-
 30 λακότητι, πυκνότητι, τοῖς ἄλλοις. ὁμοίως καὶ
 σὰρξ καὶ τὰ ἄλλα μῑρία. ἔτι δὲ τὰ ἐν τῷ αὐτῷ
 ζῳῳ διαφέρουσι πυκνότητι καὶ μανότητι καὶ τοῖς
 ἄλλοις, ὥστ' οὐχ ἡ αὐτὴ κρᾶσις. παχὺ μὲν γὰρ

¹ κρᾶσιν B.² αἰτίαν B.

ON BREATH, ix.

markable feature occurs with the soul ; for it exists in them also. Therefore the fact that its motion always exerts a similar activity may reasonably be referred to the same source, either completely or to some part which produces the result ; for the nature, from which their birth arises, remains the same. But what difference can there be between the forms of heat occurring in each individual ? Whether we are considering the heat as an instrument, or as matter, or as both. For the only differences that heat can show must be in its greater or smaller quantity. This is equivalent to finding it in a mixture or unmixed ; for the purer is more. The same argument applies to other simple substances. For it is necessary, since the bone or flesh of the horse and ox differ, that they must either be composed of different substances, or be employed in different ways. If they are actually different, what are the differences between each of the simple things, and what is it ? For this is what we are looking for. If they are the same, then they can only differ in proportion. One of these two things must be true, as in other cases ; for a mixture of wine and honey differ because of their material, but a mixture of wine differs, if it differs at all, because of its proportion. Therefore Empedocles described the nature of bone as only one, supposing that all have the same proportion in the mixture, so that there should be no difference between the bones of a horse, lion and man. But they do differ in hardness, softness and in other qualities. So also do flesh and other parts differ. They even differ in hardness and softness, and in other qualities in the same animal, so that the proportion of mixing cannot be the same. For coarse and fine, great and

485 h

καὶ λεπτόν καὶ μέγα καὶ μικρόν εἴη ἐν τῷ ποσῷ,
 35 σκληρόν δὲ καὶ πυκνόν καὶ τὰ ἐναντία τούτοις ἐν
 τῷ ποιῷ τῷ τῆς μίξεως. ἀναγκαῖον δὲ τοῖς οὕτω
 λέγουσιν εἰδέναι πῶς τὸ δημιουργοῦν ἕτερον εἴη
 486 a ἄν. καίτοι τοῦτο πλεόν ἢ ἔλαττον εἶναι, καὶ τῷ
 καθ' αὐτὸ καὶ τῷ μεμιγμένῳ, ἢ ἐν ἄλλῳ πυροῦσθαι
 καθάπερ τὰ ἐψόμενα καὶ ὀπτώμενα. ὅπερ ἴσως
 ἀληθές· ἅμα γὰρ ἐγκαταμίνυνται καὶ ποιεῖ τὸ τῆς
 486 b φύσεως. ἄρα ὁ αὐτὸς καὶ περὶ σαρκὸς λόγος· καὶ
 γὰρ αἱ αὐταὶ διαφοραί. σχεδὸν δὲ καὶ περὶ φλεβὸς
 καὶ ἀρτηρίας καὶ τῶν λοιπῶν. ὥστε δυοῖν θάτερον,
 ἢ οὐχ εἰς ὁ λόγος τούτων κατὰ τὴν μίξιν, ἢ οὐ
 σκληρότητι καὶ πυκνότητι καὶ τοῖς ἐναντίοις τοὺς
 λόγους ληπτέον.

ON BREATH, ix.

small, are quantitative differences, but hard and thick and their opposites are differences in the quality of the mixture. But those who argue in this way must know how what creates them differs. And yet this too may be either greater or less, and may differ by existing alone or in a mixture, or by being heated in something else like things which are boiled or baked. Perhaps this is the true solution ; for it is in the mixing that it achieves its true nature. Then the same explanation may be given of flesh ; for the differences in it are the same. And the accounts of vein, air passage and the rest are approximately the same. So of two things one is true : either the proportions of the mixtures are not the same, or we cannot give any true account in terms of hardness, thickness or their opposites.

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